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- *The Way to the Top* 69
- *Latest Automatic Copying Methods* 83
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- *Your Changing Export Markets* 80
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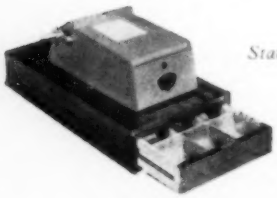


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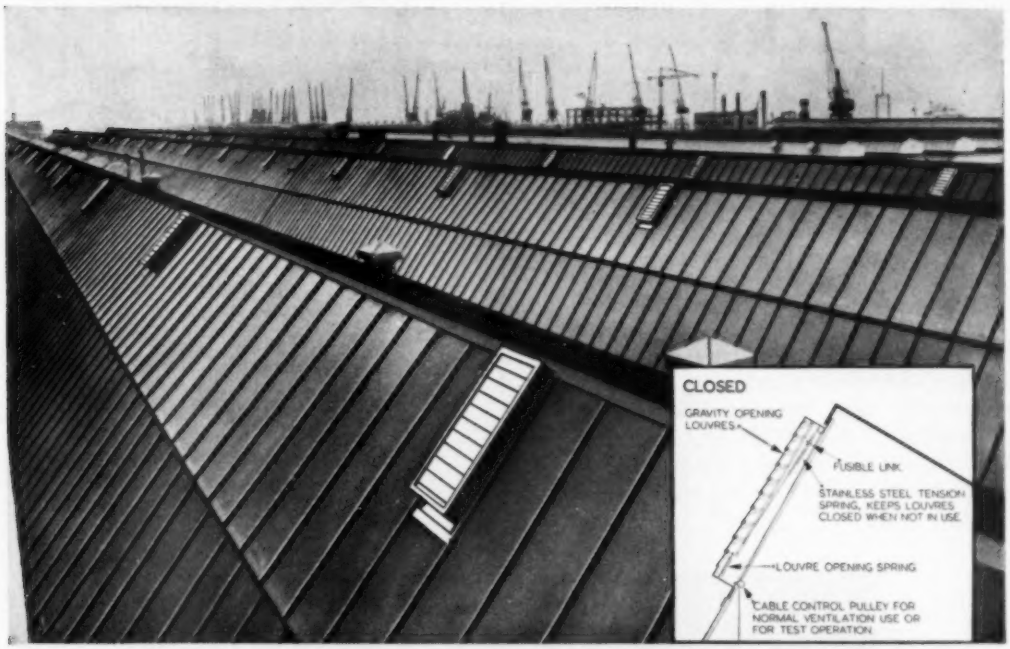
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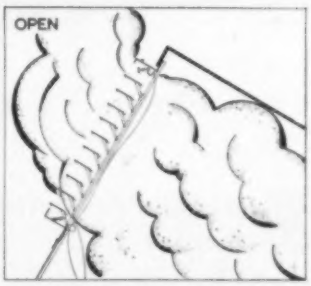
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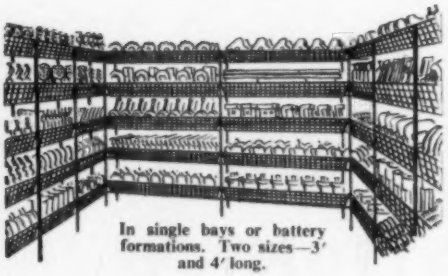
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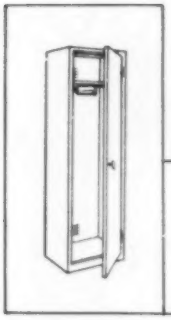
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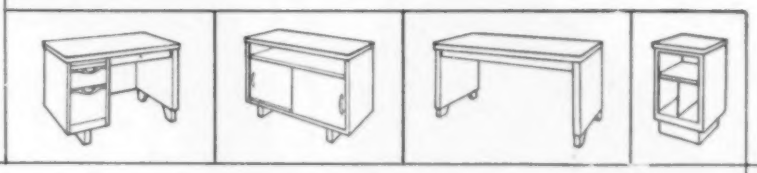
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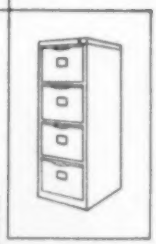
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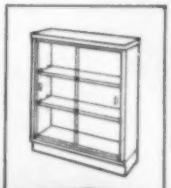
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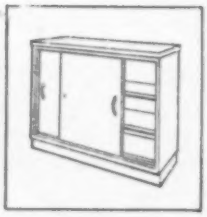


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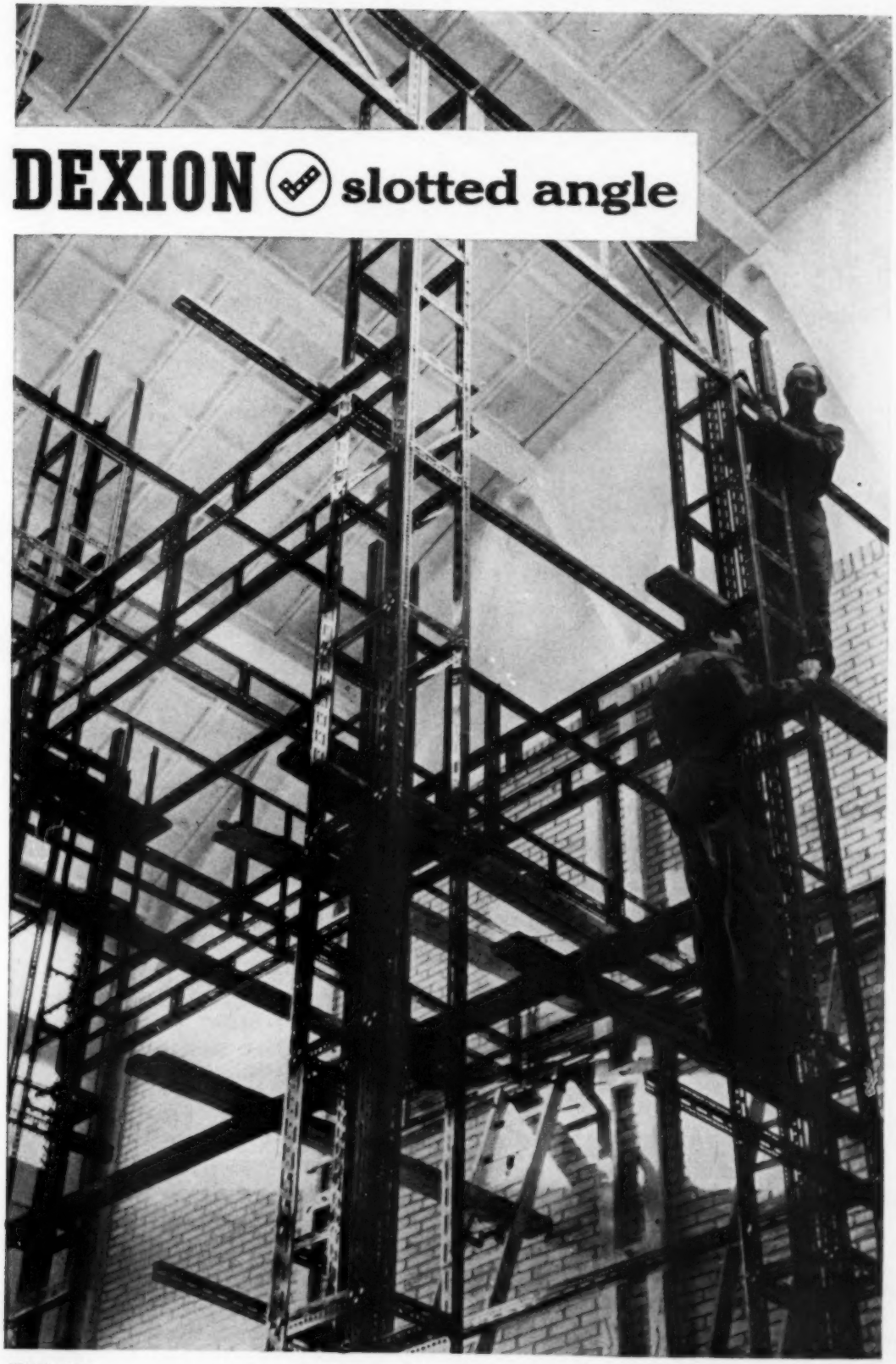
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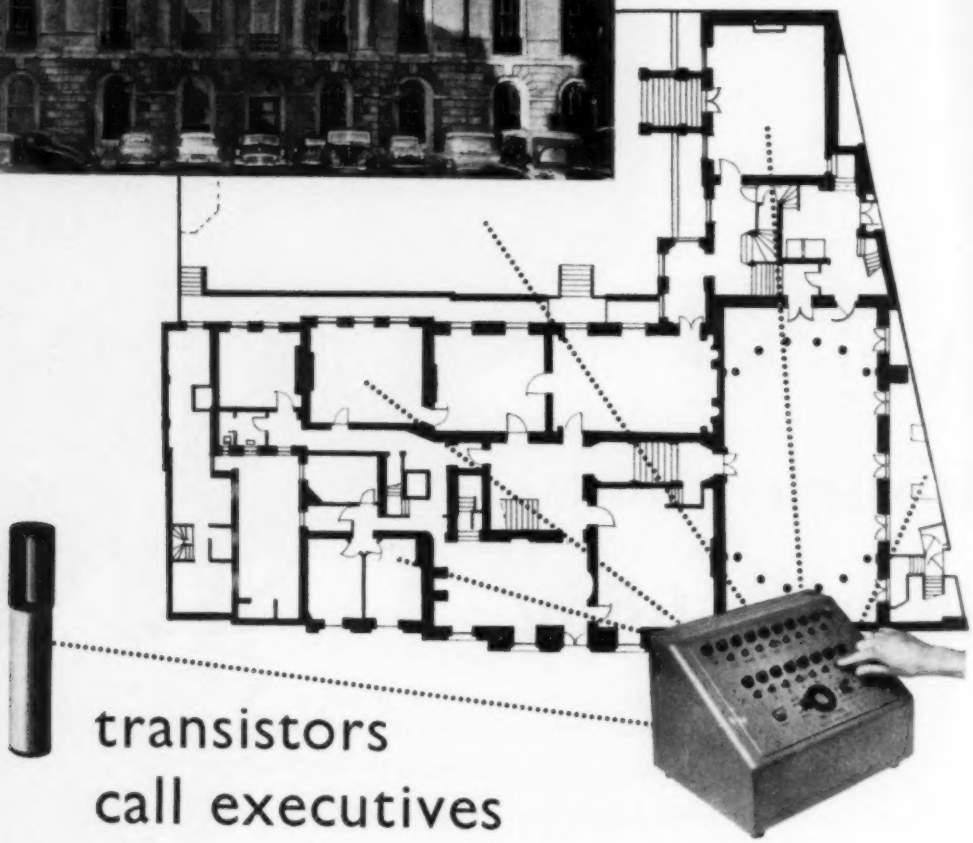
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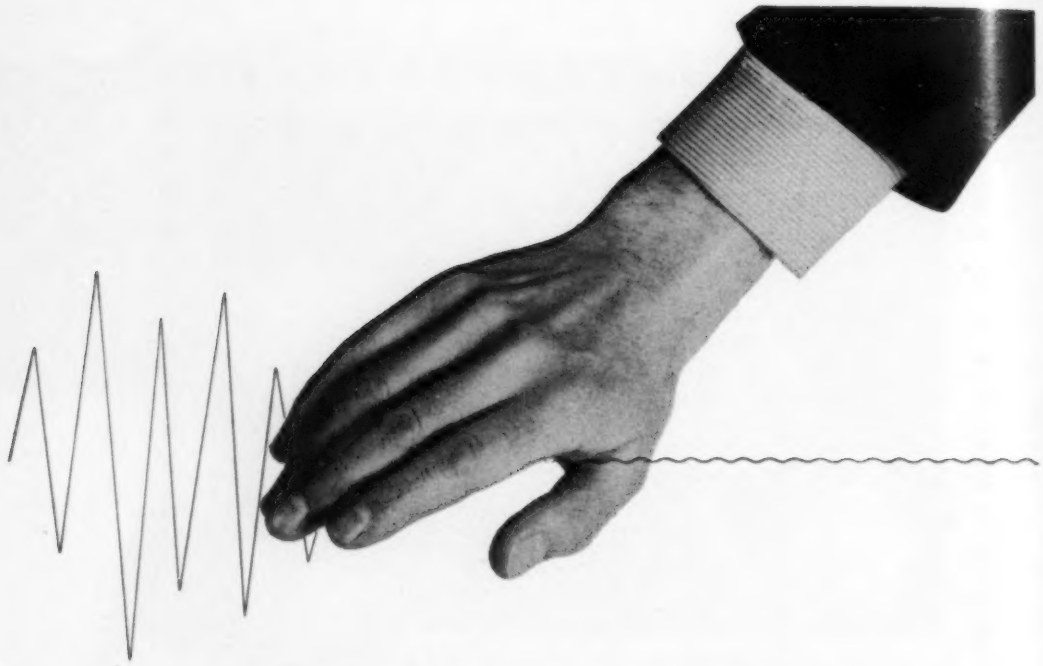
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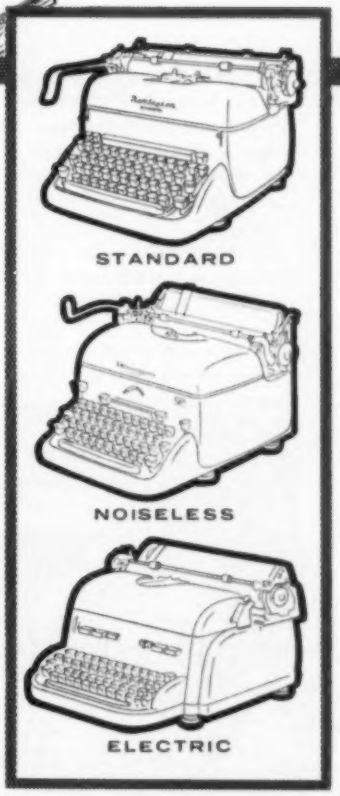
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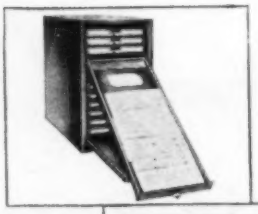
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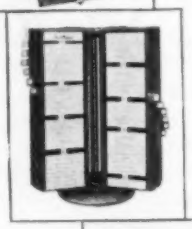
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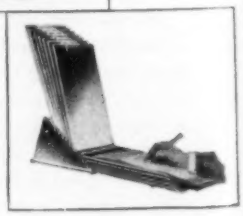
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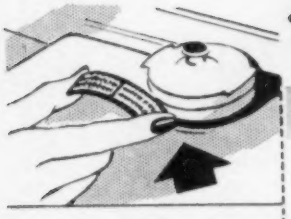
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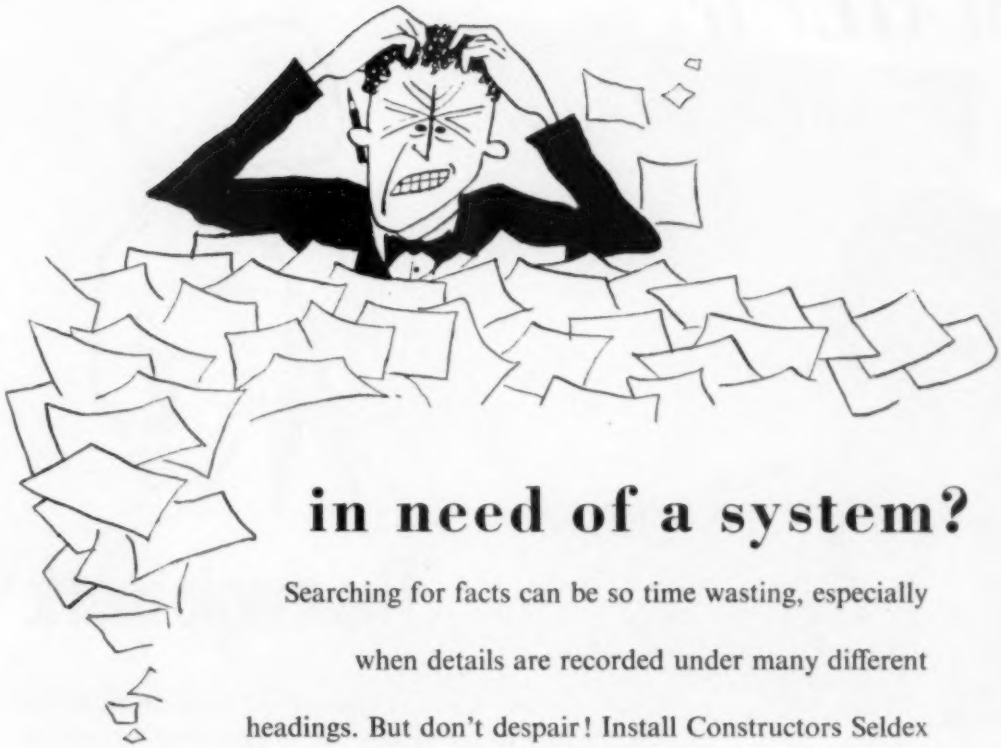
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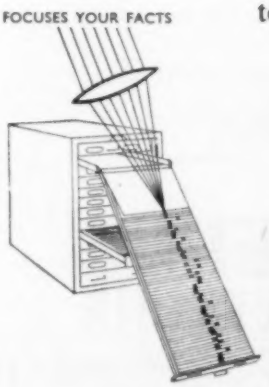
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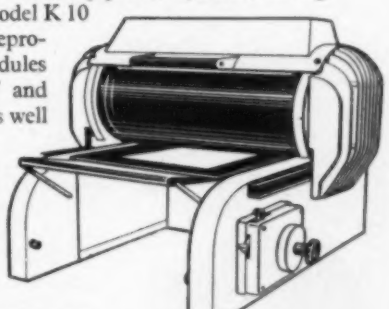
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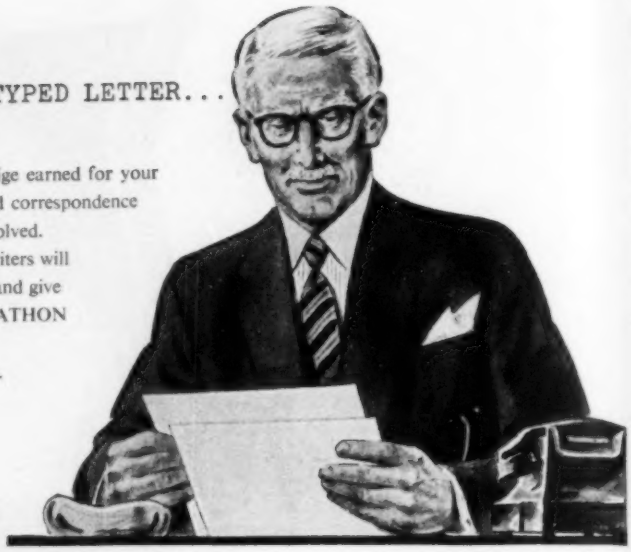
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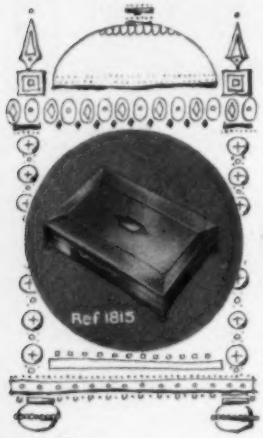
CA49

A GIFT At any time IS WELCOME!

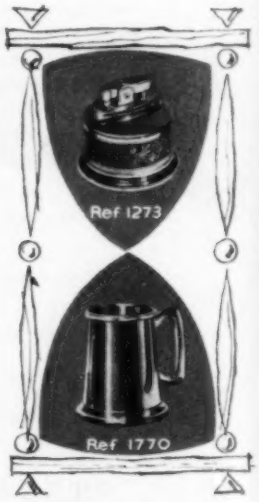
Not only at Christmas, not only on birthdays, but *any* day everyone enjoys getting a gift. Such advertising gifts as these from Sculthorp's can bring good-will and bigger business from any client lucky enough to receive them! And, in the fully-illustrated Sculthorp Brochure "Year after Year", selections from their extensive range are illustrated; send for *your* free copy, or for actual samples based on your special needs. We suggest that, if possible, you will find a visit to our newly opened modern showroom both interesting and helpful.

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Ref: 1815: *Chrome Cigarette Box.* 25-50-100 *size*



L9244C



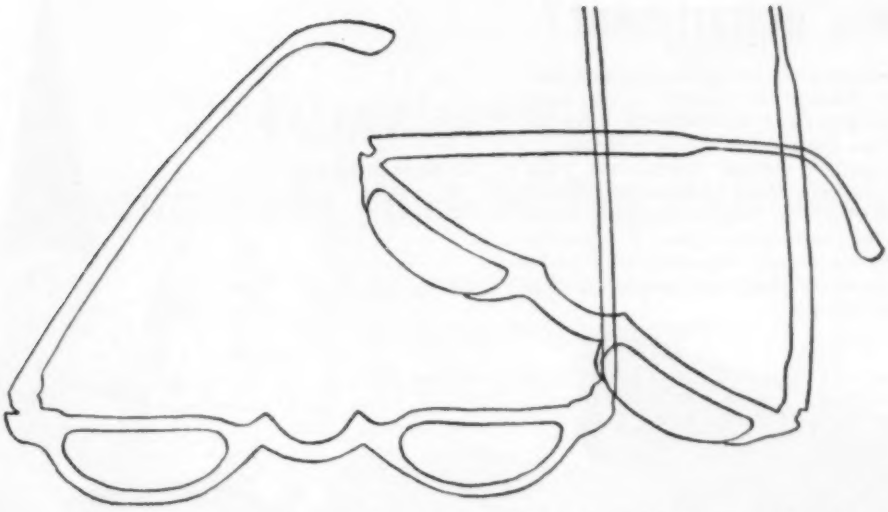
Ref: 1273: *Ralster 'Marlborough' Table Lighter.*
Ref: 1770: *Pint Plain Pewter Tankard*

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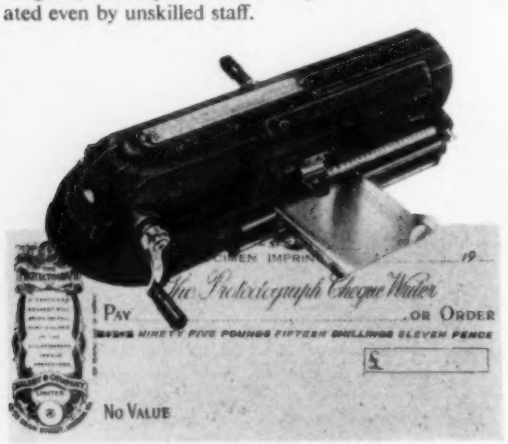
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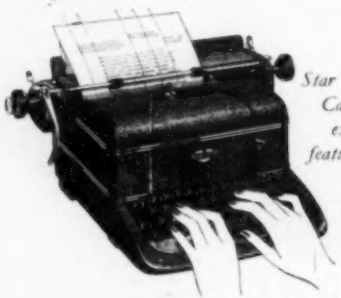
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All dial figures are large and the dials are close to the openings, making the Figurematic foremost in readability.

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The automatic multiplier will accept entries as fast as the operator can read the figures—"remembering" the entries and multiplying by each digit in immediate sequence.

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Fewer controls make Marchant easier to learn. Compact grouping under the fingertips of one hand reduces hand-travel — makes the Figurematic faster, easier to operate.

a B&A business machine

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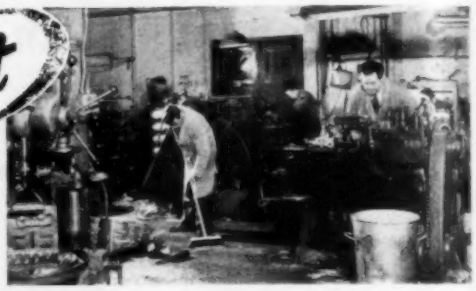
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Are there things you require to be sealed?
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Take a tip from wise Timothy Tapir
And no matter whatever the shape,
Be it card, be it tin, be it paper,
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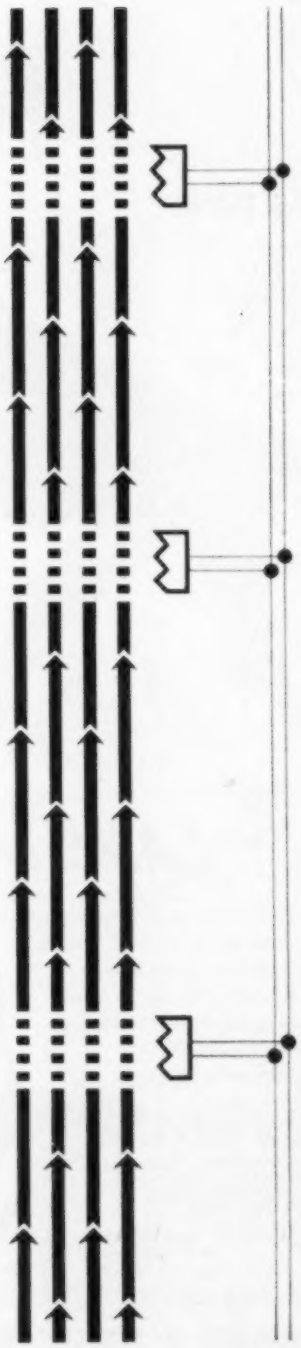
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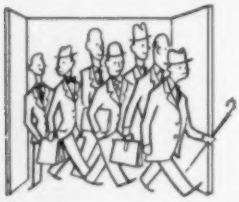
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When it's time





for all good men
to come to the party...





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saves time—saves money

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TRANSPARENT CELLULOSE tape for sealing, holding, joining and binding. Used as a protective layer over labels, is G.P.O. approved for sealing registered letters and parcels.

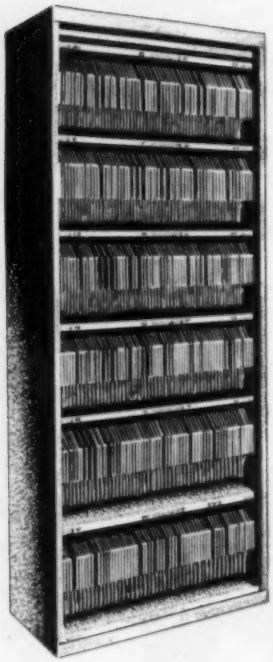
COLOURED CELLULOSE tape. Particularly useful for coding, identifying and filing.

"WRITE-ON" Sellotape for stock control, bin labelling, coding. Specially prepared surface, takes ball point, pen and pencil.

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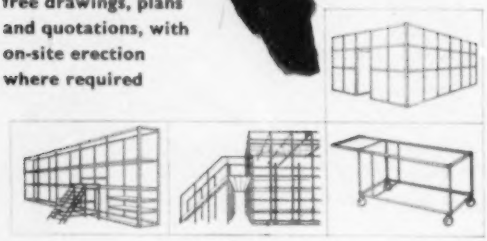
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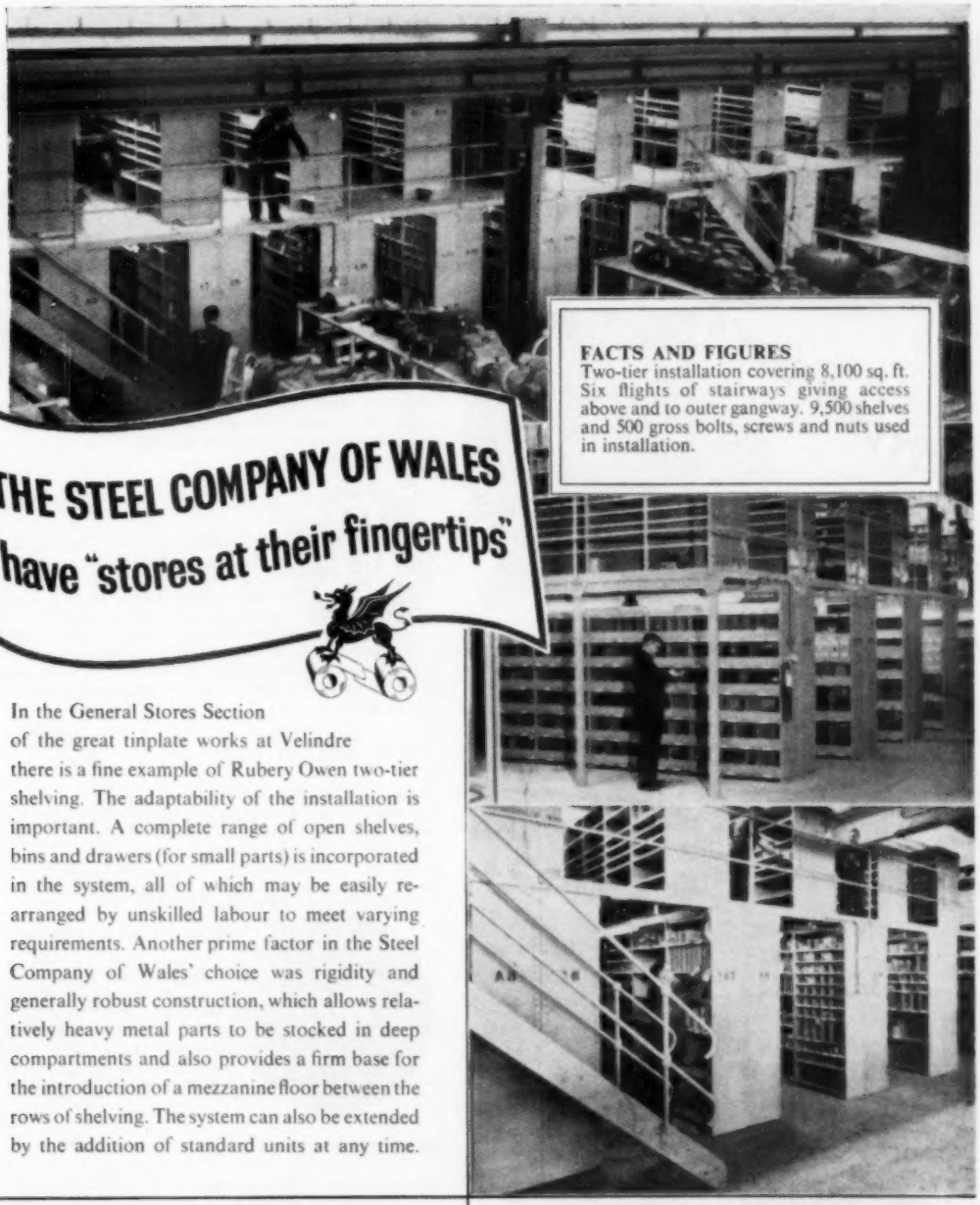
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In the General Stores Section of the great tinplate works at Velindre there is a fine example of Rubery Owen two-tier shelving. The adaptability of the installation is important. A complete range of open shelves, bins and drawers (for small parts) is incorporated in the system, all of which may be easily re-arranged by unskilled labour to meet varying requirements. Another prime factor in the Steel Company of Wales' choice was rigidity and generally robust construction, which allows relatively heavy metal parts to be stocked in deep compartments and also provides a firm base for the introduction of a mezzanine floor between the rows of shelving. The system can also be extended by the addition of standard units at any time.

RUBERY OWEN OF WREXHAM are specialists in design and production of stores equipment. Their technicians are always pleased to advise and co-operate on all types of shelving installations and can also provide erection service.

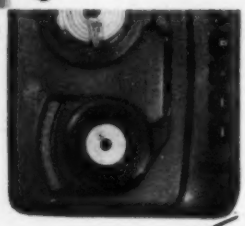
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Steel Shelving
ADJUSTABLE—EXTENDABLE—INVALUABLE

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Typewriter's other half



How many hours a day is the typewriter standing idle because a secretary is taking dictation, or making memos of 'phone messages or conference minutes?

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A Stenorette 'S' dictating machine keeps those typewriters active. It eases everyone's working day, boosts output, can even help with jobs like stock-taking.

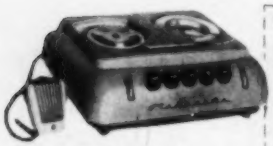
And if you never used it for anything else, its ability to record both sides of a telephone call would repay its cost over and over again in the course of a year.

The Stenorette 'S' costs only 52 Gns. complete—no more than a typewriter . . . but it makes the typewriter twice as valuable

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Stenorette 'S'

DICTATING MACHINE



- 25 minutes dictation
- Automatic backspace and erase
- Facilities for telephone and conference recording
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SERVIS RECORDER SYSTEM



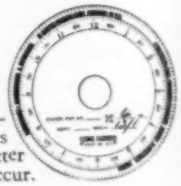
WHAT IS IT ?

The SERVIS RECORDER consists of a simple clock mechanism, enclosed in an aluminium case, which rotates a circular wax-coated paper chart calibrated in minutes and hours. Also inside the case is a small yet heavy pendulum fitted with a sapphire-pointed stylus which draws a continuous line on the chart as the chart is rotated by cutting through the wax. No ink is used and the line cannot be erased or altered.



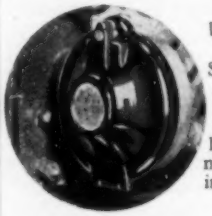
HOW DOES IT WORK ?

If the SERVIS RECORDER is stationary, the pendulum hangs down at rest and draws a smooth continuous thin line on the chart. If it is moved, the pendulum swings to and fro, drawing small transverse lines on the chart instead of a thin continuous line. In other models, the pendulum is moved electro-magnetically by means of a low-voltage circuit incorporating a micro-switch operated by a moving part of any machine.



WHAT DOES IT DO ?

From an examination of the chart it is possible to tell the precise periods when the machine or vehicle was running or stopped, by noting the times when the variations in the character of the line traced by the stylus occur.



WHERE IS IT FIXED ?

So long as the pendulum is substantially vertical in the rest position, the SERVIS RECORDER can be mounted in any convenient location; on or near production machinery—or in the driver's cab in the case of vehicles.

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By providing a written record of a vehicle's movements (or of a machine's running time), the SERVIS RECORDER enables you to improve output, reduce overheads and cut out time-wasting by planning on facts, not guesses.

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BPL/D 52



Colour harmony in the Factory

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It costs no more to use paint *productively* than it does to perpetuate dullness, so why not let us talk it over with you?

COLOUR ADVISORY SERVICE



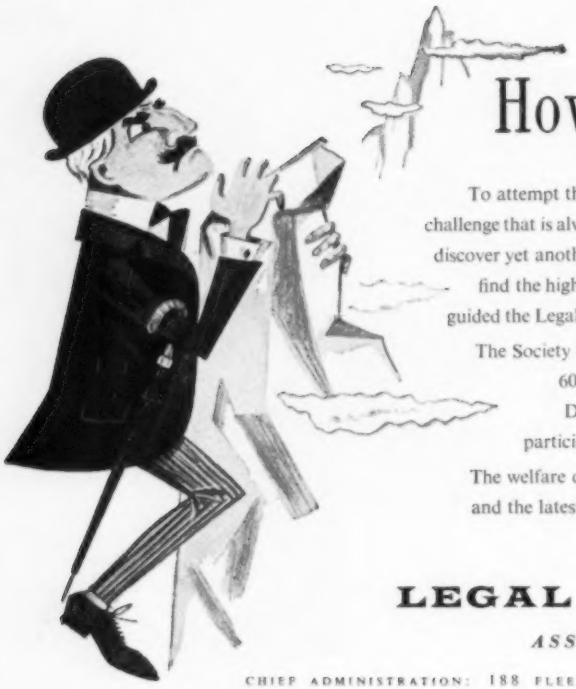
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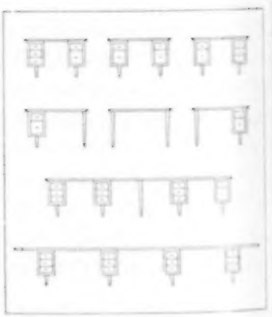
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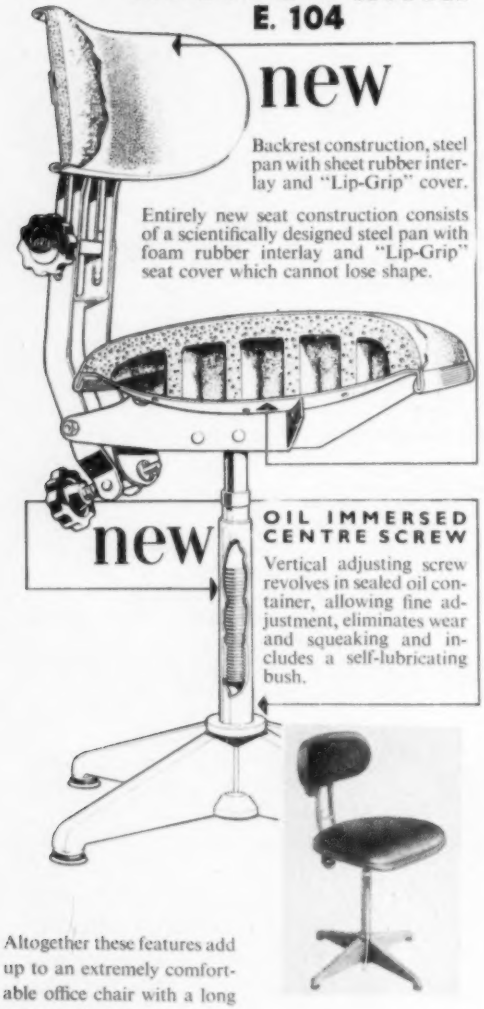
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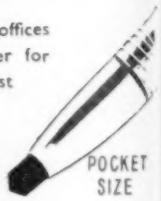


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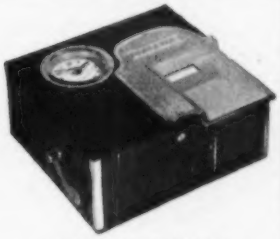
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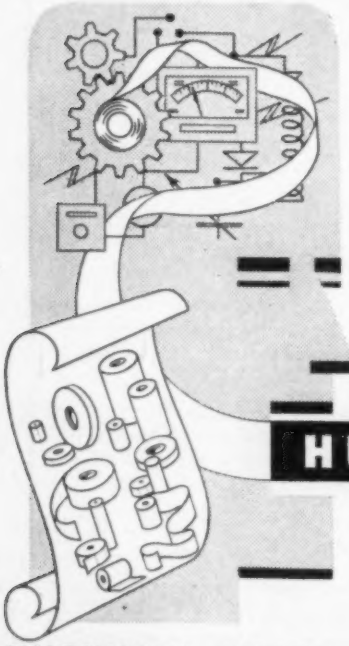
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Special 'BUSINESS' Survey and Forecast

STATE OF THE NATION

Production likely to rise in step with mounting employment • Overseas trade at record levels, and outlook promising • Capital expenditure bouyant • Stocks held in check • Consumer spending is rising • Prices and wages likely to move slightly up • Boom conditions may defer prospect of cheaper or easier credit.

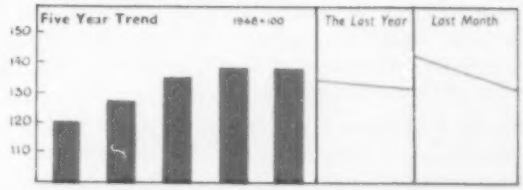
Industrial Production is still barely keeping level with last year, but it should rise in the autumn. Provisional April, 1957, figure of 133-4 shows a fall on 136 a year earlier. In the period February to April, 1957, the average index was 139½ (1948 = 100). This was the same as a year earlier but 18 points higher than four years earlier.

The Number of Unemployed has shrunk relative to the number of Job Vacancies, and is likely to fall further. In May there were 283,000 vacancies, and 313,000 unemployed. During the three months March to May the average number of unemployed was 100,000 more than the number of vacancies. A year earlier there were 137,000 more vacancies than unemployed, but four years earlier there were 97,000 more unemployed than vacancies.

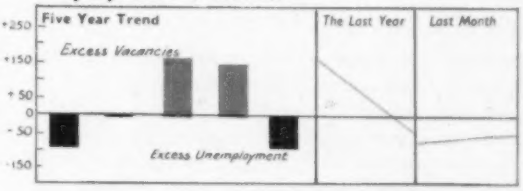
Trade Gap Between Imports and Exports seems likely to continue at a manageable level. In May the gap was £59.7 million, which compares with £68.8 million in April and £31.9 million a year earlier. During the period March to May average monthly gap was £59.0 million—a rise on £35.8 million a year earlier but a fall on £69.4 million four years earlier.

Gold and Dollar Reserves have risen again slightly, and may continue buoyant. In May the reserves stood at £838 million, which compares with £829 million a month earlier and £846 million a year earlier. During the period March to May, average level was £819 million, which was less than the £830 million a year earlier, but more than the £805 million four years earlier.

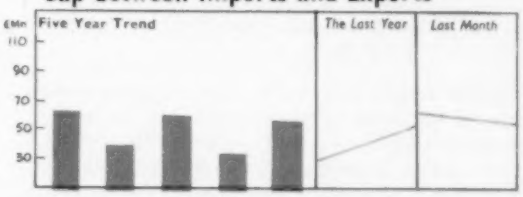
Industrial Production



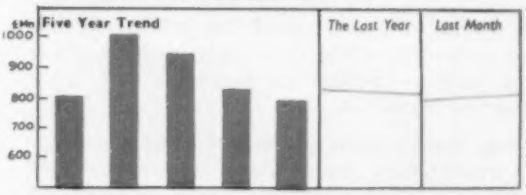
Employment Position



Gap between Imports and Exports



Gold and Dollar Reserves



THE CHARTS: Except where otherwise indicated, each bar chart depicts the average monthly value of a particular statistic during the most recent three months, and compares it with the same figure for each of the four preceding years. The earliest year in each case is shown on the extreme left. Under the heading "The Last Year," a straight-line graph depicts the latest month of a particular statistic and compares it with the same month a year earlier. And under the heading "Last Month," the most recent figure is compared with the one for the previous month. In both cases, the earlier figure is to the left and the later figure to the right.

MAIN ECONOMIC INFLUENCES on the STATE OF THE NATION

1. Trends in CAPITAL SPENDING

Industrial Investment Plans suggest that total capital spending in 1957 is likely to be at least as great as in 1956. Bars in the accompanying chart show average quarterly expenditure for years 1952 to 1956. The 1956 average is estimated to have been about 20 per cent above 1955 and about 75 per cent above 1952. The Board of Trade Survey shows that in the first quarter of 1957 capital expenditure by manufacturing industry was about 10 per cent higher than a year earlier.

Factory Buildings Approvals have declined considerably. During the first quarter of 1957, total area approved was 13.7 million sq. ft., which compares with 15.3 million the previous quarter and 21.7 million a year earlier, but only 8.1 million four years earlier. The decline in expenditure plans for new factory buildings is, however, matched by plans for increases in other forms of capital expenditure.

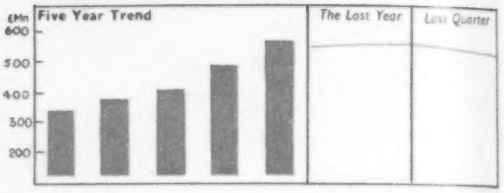
Machine Tool Orders have recovered. In March, orders were worth £7.9 million compared with £6.7 million in February and £7.7 million in March, 1956. Outstanding orders, shown in the chart, were £94.7 million in March—equivalent to 10½ months' deliveries. A year earlier they were £103.7 million.

Industrial Hire Purchase has recently been rising. The Board of Trade index for H.P. financing of industrial plant and equipment was 127 in April, a rise of 27 points on March and 59 points above a year earlier. The accompanying chart is based on figures collected by Hire Purchase Information. Between April and May monthly H.P. contracts for new cars and commercial vehicles rose from 17,700 to 21,900. Average monthly number of contracts in period March to May was 18,800 a rise on 15,200 a year earlier.

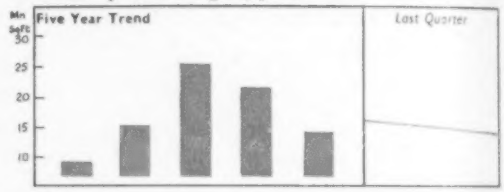
Material Stocks have lately risen in manufacturing industry but decreased in commerce and Government. Manufacturing stocks index for March, 1957, was 113.0 (1955 = 100), which compares with 103.9 a year earlier. Non-manufacturing stocks fell by about 13 per cent in the first quarter of 1957. In December 1956 the level was already about 9 per cent below December 1955. Bars in the chart show changes in value of stocks during the years 1952 to 1956. Graph lines show changes in the index of manufacturing stocks compiled by the Board of Trade.

Home Building Starts are above the level a year ago. Permanent houses started in the first quarter of 1957 totalled 64,600 compared with 62,000 a year earlier and 84,000 four years earlier. Number under construction at March 31, 1957 was 258,400 which compares with 286,800 a year earlier.

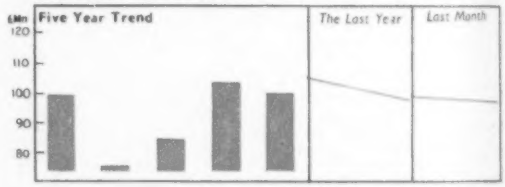
Industrial Investment Plans



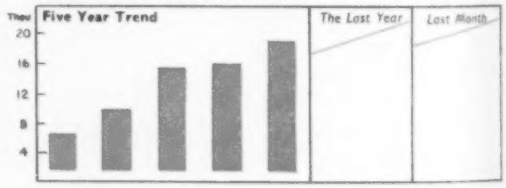
Factory Building Approvals



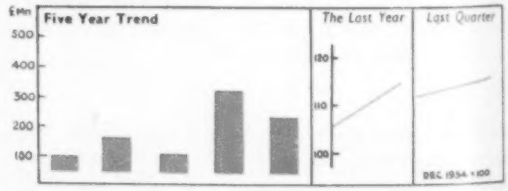
Machine Tool Orders



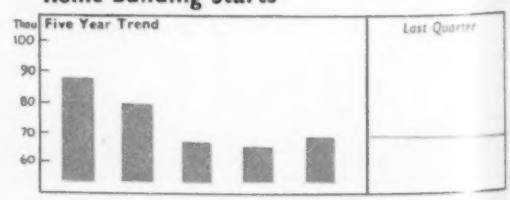
Industrial Hire Purchase



Business Stocks



Home Building Starts



2. Trends in CONSUMER SPENDING

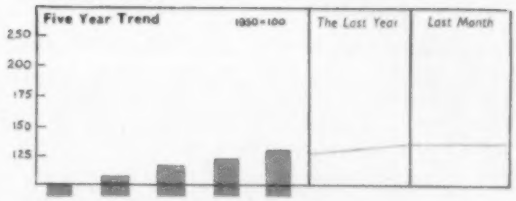
Retail Sales outlook is promising. In April the index was 148 which compares with 144 for March and 138 a year earlier. During period February to April 1957, the average index of retail sales was 143, which compares with 136 a year earlier and 117 four years earlier. Consumer spending should go on increasing.

Domestic Hire Purchase business has recently been sluggish. The Board of Trade index for H.P. sales of household goods was 66 in April, a fall on the March figure of 69 but above the figure of 62 a year earlier. The accompanying chart shows the trend of H.P. sales of used cars. Between April and May the number of contracts rose from 50,300 to 66,000. Average monthly number of contracts during the period March to May was 47,900 a rise on 30,600 a year ealier and much greater than the 14,200 four years ago.

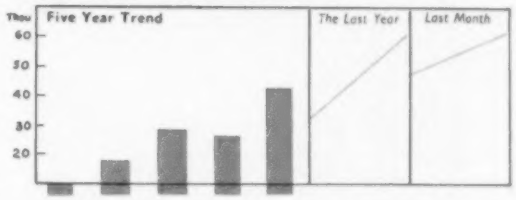
Weekly Wage Rates are likely to rise by a point or two. The March index was 107, or the same as in February and 2 points higher than a year earlier. In the period January to March the average index of weekly wage rates was 107, which compares with 103 a year earlier and 86½ four years earlier.

Personal Expenditure is rising, and likely to continue to do so. In the fourth quarter of 1956 it was £3,606 million, which compares with £3,467 million a year earlier. Provisional estimates suggest that in the first quarter of 1957 it was substantially higher than a year earlier, even allowing for price increases.

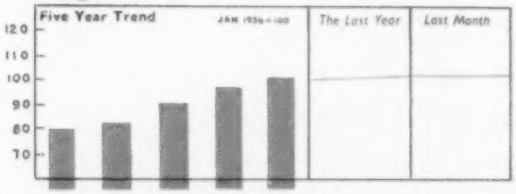
Retail Sales



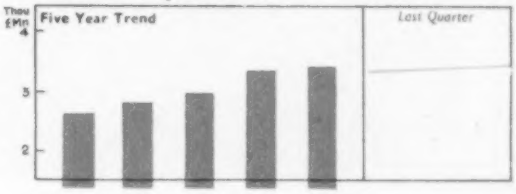
Domestic Hire Purchase



Wage Rates



Personal Expenditure

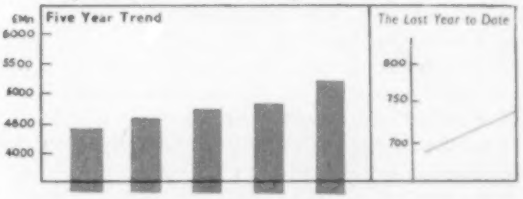


3. Trends in PUBLIC SPENDING

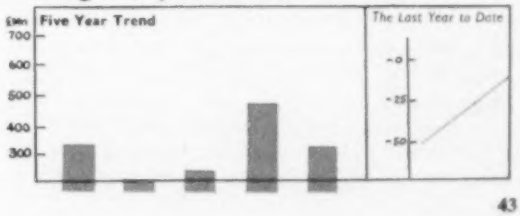
Payments from the Exchequer in the current financial year are about £60 million above the same period of last year, though they are expected to be about £40 million lower over the year as a whole. Between 1952 and 1956, Government expenditure increased by 17½ per cent and prices rose by 12 per cent, so that expenditure in real terms rose by 5 per cent.

Budget Surplus expected in the current financial year is £462 million, which compares with an actual surplus of £290 million in the last financial year. The accompanying bar chart shows the budget surpluses in the calendar years 1952 to 1956. These are the above-the-line surpluses. The graph line indicates that the deficit in the current financial year to date is so far less than a year earlier.

Payments from Exchequer



Budget Surplus or Deficit

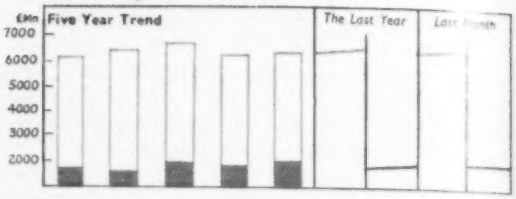


4. Trends in CREDIT POLICY

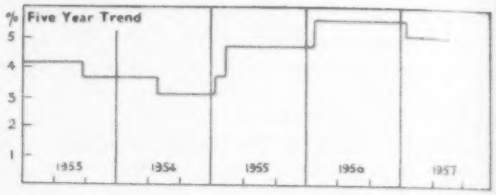
Bank Deposits and Advances have both recently been higher. During period March to May, average level of bank deposits was £6,300 million. This compares with a level of £6,200 million a year earlier and £6,100 million four years earlier. Bank advances during the period March to May were at an average level of £2,000 million or higher than the figure of £1,900 million a year earlier and higher than the level of £1,800 million four years ago.

Bank Rate at the time of going to press is still 5 per cent. The accompanying chart shows the movement of bank rate for the last five years. In March, 1952, the rate was raised from the long-standing 2½ per cent to 4 per cent. It later went down to 3 per cent and then up to 5½ per cent. But on February 7 this year it was reduced to 5 per cent.

Bank Deposits and Advances



Bank Rate



5. Trends in MARKET PRICES

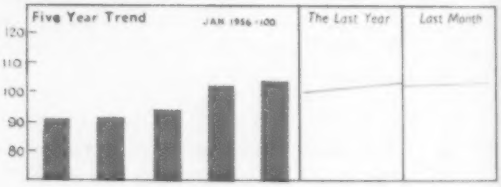
Retail Prices are continuing fairly steady, but may move slightly up. The new series index for May was 104.6, slightly above the March figure of 104.5 and the level of 102.5 a year earlier. Average figure for period January to March was 104½, which compares with 102½ a year earlier and 91½ four years earlier.

Raw Material Prices have lately been fairly steady. In May the price index of basic materials used in non-food manufacturing industry was 159.7, a fall of 0.5 points on April and an increase of 3.8 on a year earlier. Average level of the index during the months February to April was 159.7. This compares with 155.4 a year earlier and 148.8 four years earlier.

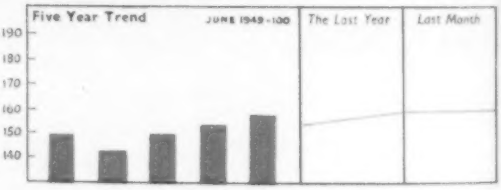
Import Prices have recently risen and Export prices remained steady. In April the import price index rose 1 point to 111 and the export price index remained at 110. During the period February to April average level of the import price index was 111, or 5 points higher than a year earlier and 7 points higher than four years ago. In the three months February to April average level of the export price index was 110. This was 5 points higher than a year earlier and 8 points higher than four years ago.

Share Prices have remained buoyant. During the period March to May the average level of the Financial Times index of industrial ordinary share prices was 196.4. This represented a considerable rise on the level of 183.8 a year earlier. In June at the time of going to press, the index was hovering around the May average of 204.5.

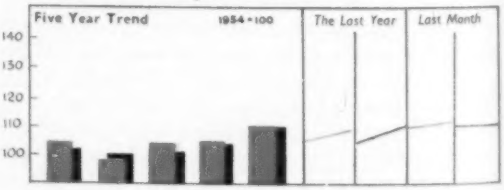
Retail Prices



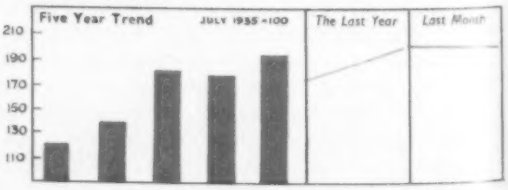
Raw Material Prices



Import and Export Prices



Share Prices





Happy ending begins...

A satisfactory pension will no doubt accompany the presentation. No company wishes that an old and valued servant should have anything but a happy and peaceful retirement. But the absence of a properly funded pension scheme can mean that through good years or bad the firm is faced with mounting financial responsibility in this respect, which has to be met out of current revenue.

Every employer nowadays has to consider this problem. The sensible solution is to install a permanent pension scheme, so that each man's pension is paid for during the time when he is actively at work and contributing towards the profits. In this way the *cost ends when his retirement begins*. For the best type of scheme and the most experienced advice on the subject, consult Noble Lowndes.

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COMPANY MEETING

THE LITTLEWOODS ORGANISATION

GROUPS' PROGRESS MAINTAINED

MR. JOHN MOORES ON "CREDIT SQUEEZE"

The Littlewoods Organisation—1956/7 has been an important year for us. On the one hand the effects of the credit squeeze, to which I shall refer in more detail later on, have slowed down the expansion of some parts of our business. On the other hand we have carried through certain reorganization which will, I am convinced, prove of the utmost benefit during the coming year. Perhaps I would best describe the past 12 months as a period of consolidation. Nevertheless, our gross turnover, irrespective of Pools, has increased by over 6 per cent and now stands at £48 million per annum, against £45 million per annum for 1955/6.

LITTLEWOODS POOLS LTD.

As is our legal obligation laid down in the Pools Betting Act of 1954, we published our Accounts on the 31st August, 1956.

The now very recognisable cycle caused by rising material and labour costs is very naturally reflected in an operation which employs many thousands of men and women and a very considerable quantity of materials of which paper forms a very large part; therefore, due to circumstances beyond our control, the costs of running the Pools has slightly increased.

However, the Executives of the Pools are continually investigating new methods for increasing efficiency with what must be subsequent economies. The efforts over the years have proved their considerable success, because our average operating costs have been and still are lower than any other Pool in this country.

In my last report, I mentioned the attention we paid to the well-being of those who win large sums of money on Littlewoods Pools. I think it must be of considerable interest to financial people, economists and sociologists to know that our careful records of investigation prove that in a very high percentage of the cases of the big dividend winners, after supplying the requirements of the family, paying off the house mortgage, the acquisition of a small car, they invariably devote the rest of their money to investment in Government Savings, Gilt Edge Securities and other sound propositions yielding them attractive regular incomes without dispersing the bulk of their Capital, which is devoted to the furtherance of the country's Industrial and Economic progress.

MAIL ORDER STORES

I am happy to report that our Mail Order business continues to prosper. We founded it in 1932 as a cash club business and it has developed along the lines laid down at the start, growing steadily on a pattern profitable to our public and ourselves. In the past year our Organisers who collect both orders and cash and then forward them to us, have found that more and more their customers want their goods quickly. We have helped organisers to meet this need by encouraging them to deposit money with us at 5 per cent interest, in return for our allowing them to take goods in advance payment, in proportion to the value of their deposits. The response has been extraordinary. The idea was welcomed as a real contribution enabling Organisers to serve their members better and to do better business for themselves. Many people have asked why we had not started this system before. We had to reply, I admit it, that we just did not think of it.

This system is now a success and deservedly so. For our part we are proud that people are prepared to deposit money with us, and, from a purely objective point of view, we are satisfied that by relating the value of the goods forwarded to the amount of money deposited, we have a sufficiently tight control to enable us to prevent this unique trading device from being inflationary to any extent.

One of the problems in retail selling, whether it be by Mail Order or in Stores, is keeping adequate but not swollen stocks.

We pride ourselves that we do this reasonably efficiently, but we have always sought ways and means of utilizing the tremendous statistical information at our disposal. But so far this has been extremely difficult, if not impossible, because of the time it would have taken.

Now, with the application of electronics in commercial work, we think we can see the answer to this problem, and have ordered an electronic computer which will cost us around £80,000. In doing this our objective is not to dispense with labour, but to achieve a more efficient stock-keeping by taking advantage of the most up-to-date scientific device.

CHAIN STORES

The main points to be noted as marking progress over the last year are the improved standards of styling we have introduced into our clothing ranges, both for men and women; and the considerable increase of the sale of food in the Stores.

No one can sell clothes successfully today without a high degree of fashion awareness. We have always known this, but we also know that just to accept this axiom without making an all-out effort to put it into practice merely breeds that most dangerous attitude, complacency. And so, over the past year we have not hesitated to integrate many of our people who are not engaged in the Buying Departments into the vital discussions which contribute to the completion of a successful range of fashion merchandise. For we have come to believe that the opinions of the girls and women working in the Littlewoods Organisation can, when properly analysed and weighted, materially assist our buyers and the top management in determining which aspects of the latest fashion trend will really mean something to our customers.

As for food, we have developed this side of our Chain Store business as a direct result of an increased demand by our customers. As soon as we introduced food into the Stores, just after the war, we found that it had an exceptionally ready sale. By constantly stepping up our standards of hygiene and presentation, and steadily increasing the range of products for sale—we have recently introduced complete butchery departments into four of our major stores—we can now say without fear of contradiction that Littlewoods Stores sell a larger proportion of food, fresh as well as canned than any other competing chain.

THE CREDIT SQUEEZE

We opened six new stores in 1956 but nevertheless I am bound to report that the credit squeeze has hindered extension of the Chain as a whole. Obviously this is a setback and means that our target of 12 new stores per annum has to be shelved for the time being.

What is so deplorable about it from the point of view of public interest is that because Littlewoods acquired many valuable sites before the restriction on credit came into force, many of these sites lie derelict today.

To quote an example, we purchased a

site in Glasgow on which it was planned to erect a £1 million building. Littlewoods would have occupied the ground floor and basement, while a major Public Utility had agreed to occupy the rest of the building. A start was made, the basement was excavated then came the Government's announcement about restrictions on credit.

Thus, the situation now is that what could have been a valuable amenity in the third largest city in the United Kingdom is—quite literally—just a hole in the ground.

Again, we want to improve and extend our premises in Oxford Street, London. We have acquired an important site, almost derelict because of war damage, next door to our present store. But under the present circumstances we have had to stay our hand. Our public, though continuing to support us loyally, must buy their goods in premises 20 years out-of-date.

Then there is the site at Kingston-on-Thames. This is a shopping area we believe ourselves particularly well suited to serve. A growing community, youthful, modern and forward-looking in the best sense of those words, is precisely the market to which the Littlewoods chain stores are geared. The ever increasing accent on fashion in our Clothing Departments, the continued high standards over the whole range of our merchandise are just those qualities that such men and women are looking for. But, for the moment, we find ourselves unable to provide them in Kingston because of the credit squeeze.

I have spoken in detail about these three sites; I could speak in equal detail of half a dozen more. The outlook may seem frustrating but I refuse to be depressed. I refuse to be depressed because I am convinced that our economy, as a whole, is a sound one; and that it is only a matter of time—and hard work—before we can take great new strides forward; and I also remind myself that during the whole trading life of Littlewoods Chain Stores there have only been four years when we were entirely free from restrictions on building—one year before the war, and three years since.

CENTRAL BUYING

Checked in one direction, we have continued to make improvements in our organization. One of these is the establishment of a Central Buying Office situated at Crosby near Liverpool.

Until quite recently we had two Buying Departments, one for our Mail Order business, the other for Chain Stores. There had grown up a tradition that buying for mail order was in some way a specialized art, differing from buying for sale over the counter. But the fact remains that the prime object of all our buying is to provide the best possible goods at reasonable prices, and that the division between the two sides of our retail business was artificial. I believe that now we have set up the Central Buying Office, we are more efficiently organized. And I wish to take this opportunity to say a special word of thanks to our Buyers for the strenuous efforts they have made while the reorganization has been taking place.

I also want to thank all those suppliers and manufacturers who have supported us so loyally during the year. We appreciate their wholehearted co-operation in the maintenance of the quality, finish and presentation which we require so that we can give an unconditional guarantee to our customers of complete satisfaction, or money refunded.

Similar thanks are due to the staffs in our own factory who have also served us well.

THE LABORATORY

To be able to sell quality merchandise one must have the most complete arrangements possible for testing and checking samples before bulk purchases are made. We have recently extended the Laboratory at Crosby which now covers more than 7,000 sq. ft. and from first to last has called for an investment of more than £50,000.

I would stress that the laboratory has no concern as to the price of the samples submitted to it. It exists to provide standards and to see that merchandise complies with these standards. It is also the duty of the laboratory to see that shipments are equal in quality to the samples. Finally new developments in fibres, textile finishes, electrical appliances etc. have to be tested and checked.

ANXIOUS TIMES

If I concentrate largely on domestic matters it is not that we are not acutely aware of the dangers of the world we live in.

All of us have been deeply disturbed by the revolt in Hungary, the Suez Canal crisis, and the strikes which threatened the ship-building and engineering industries. Engaged in the retail trade as we are, we might well have suffered grievously. But when we look at the situation in detail, the effect of these profound shocks to public confidence has not been nearly as great as might have been anticipated. I attribute this to two things. The first is that we offer exceptionally good value for money. In a difficult situation people, who after all, must continue to buy essentials will continue to support a concern where their money will, they know, be spent to the best advantage.

Littlewoods has made a feature in recent years, of selling the very highest quality goods at reasonable prices. We believe that we have established a trading policy which is now well understood and appreciated, and that it will stand us in good stead in bad times as well as good.

PUBLIC SERVICE

As I said, the times we live through have not left us unmoved. During the Hungarian crisis, we were able to help by flying to Vienna a plane-load of clothing for the refugees who were pouring into Austria. And later when the same unhappy people were in transit to America we were able to offer hospitality and rest to some hundreds as they passed through Liverpool. I am sure it was our duty to make this contribution. Large scale organisations such as ours, have a responsibility to the whole community.

And where can this responsibility be better carried out than in the organizations 'home town'? That is why Littlewoods is actively co-operating with the Walker Art Gallery, here in Liverpool, in organising an art exhibition this Autumn which, by offering substantial prizes, will encourage the most forward-looking artists in the country to show their works on Merseyside.

ROAD SAFETY

I have said 'the whole community'. That has a national implication in one aspect of which we have been able to take a part. We have gone to considerable lengths to co-operate in road safety campaigns, both national and local. For instance we have given various Road Safety awards and all our printed material now bears road safety slogans. Again, we have printed these slogans on all the bags used in our Chain Stores.

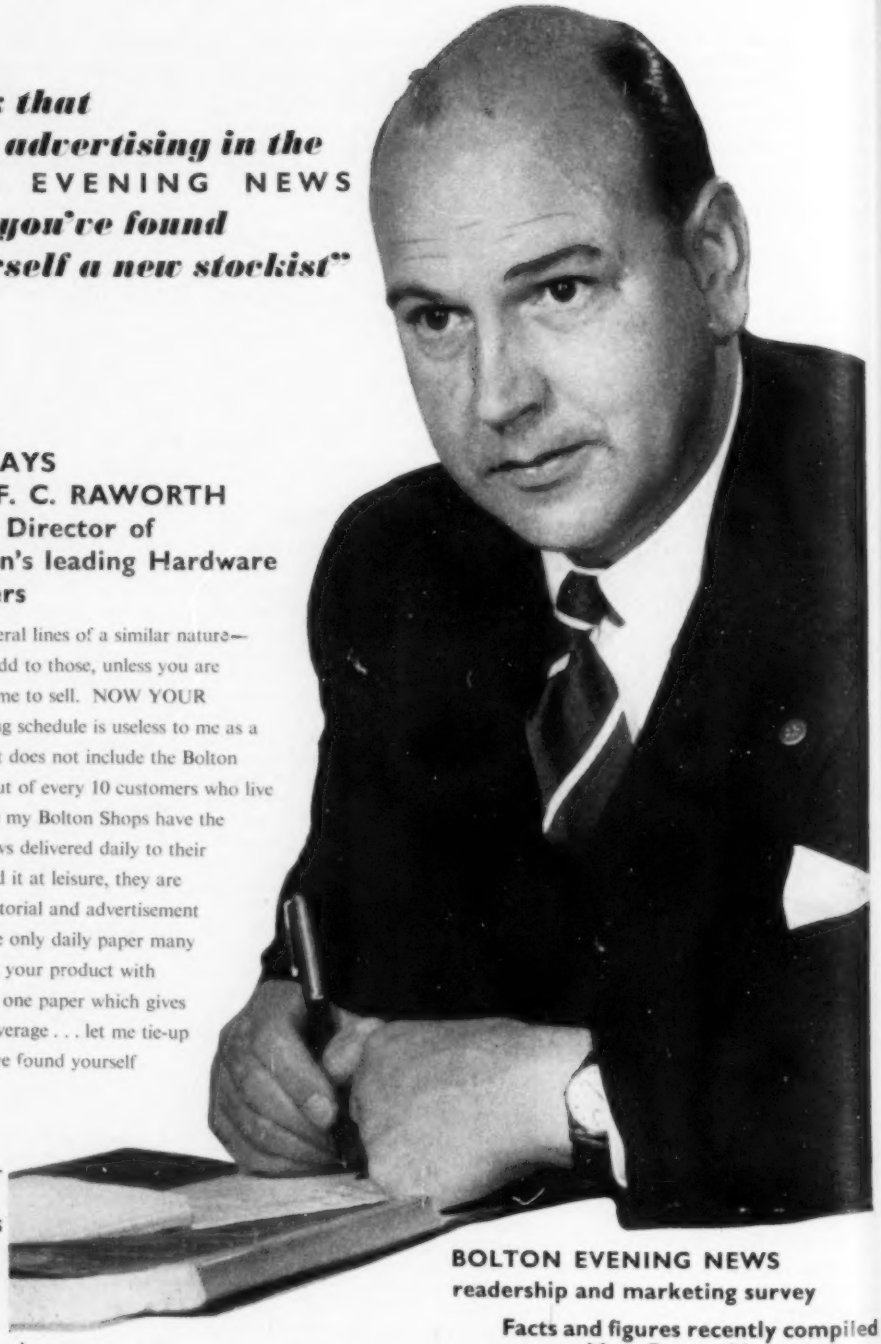
I should add this: when we first undertook this particular task, we were astounded at the simplicity of it. If other firms would do the same thing, we could all help to create and manitain a national conscience—today practically non-existent—that would effectively reduce the appalling annual total of road tragedies.

CONCLUSION

It remains for me to thank all our people for their hard work in the past 12 months and this I do very sincerely. I am very proud of the vast numbers of people we employ in our many enterprises, and I attach very great importance indeed to the many schemes we have for Training, Staff Welfare, Pensions, Sports activities etc., as I believe that a successful business must have a happy staff. In this connection, it is most gratifying that every year more and more members of the staff qualify for the gold watch we present for 25 years of unbroken service.

Not everything has gone right, as I have told you, but our trading philosophy of a fair deal for everyone has been maintained and calls for no modification: We look forward to the coming year with confidence, for I believe that we are better equipped to deal with the problems ahead than ever before.

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HOME MARKET SURVEY

A Round Britain Survey: Regional Notes on Markets and Industrial Developments

NORTHERN

PROSPECTS in the region continue favourable for both light and heavy industries, and firms are paying increasing attention to export business. More opportunities for employment are in prospect through the issue of 28 industrial development certificates—18 on Tees-side and 10 on Tyneside. They involve, respectively, total areas of 537,000 sq. ft., and 176,000 sq. ft.

Now celebrating its coming-of-age is an industrial experiment which has in 21 years transformed the economic character of the north-east. At a time when the area, heavily dependent on coal and steel, engineering and shipbuilding, was feeling the effect of the world depression, North Eastern Trading Estates Ltd., was formed to run new industrial estates on a non-profit basis on behalf of the Board of Trade. The first was at Team Valley where, after 18 months' continuous work, 700 acres of waste land were transformed into a model factory area with 11½ miles of roads and good railway access. There are today 97 firms at Team Valley, and in the north-east area as a whole, 36 trading estates serving 310 companies. These represent 30 different manufacturing groups, ranging from nylon products to clothing, and pumps to plastics.

Iron and **steel** firms are active in expansion. South Durham Steel and Iron Co. have now started on the construction of a new integrated iron and steel works which, when completed in five years time, will more than double their capacity to produce steel plate. The works will cost some £43 million and are being built at Greatham on the site of the West Hartlepool municipal airport. Capable of rolling around 600,000 tons of plate annually, a new four high plate mill is to be installed: by 1962 the company's plate capacity should be in the region of 1 million tons a year. A new slabbing mill will have a throughput of 1.5 million ingot tons annually and provision is to be made for capacity to be increased. The new melting shop is designed to produce 800,000 ingot tons of steel a year. A 27ft. 6in.-diameter blast furnace will be built and the layout designed to include, if necessary, a further large furnace. Altogether 78 new coke ovens will be required, together with by-product and coal handling and blending plants. Completion of this works will **provide employment for up to 3,000 workers** in the West Hartlepool area. Also, large-scale development of the port facilities at the Hartlepools is to be undertaken to accommodate the substantial increase in ore imports that will follow.

Some of the problems facing the industry were referred to by Sir Ellis Hunter, chairman of Dorman Long, at the company's recent annual meeting. "Any further big advance in steel production," he said, "will involve a corresponding increase in inland transport facilities. It is obvious that the railways will need to take this fully into account in the large capital programme they now envisage." The firm are finding the shortage of craft labour on Tees-side a limiting factor in finished steel production. The two new blast furnaces at the Clay Lane, Cleveland, works of Dorman Long are now in full operation. With a design capacity of 1,000 tons of iron a day, each furnace has a hearth diameter of 27ft. 6in. The British Iron and Steel Research Association at Normanby, near Middlesbrough, are actively engaged in developing a **new method of making steel** from powdered iron ore. Known as Cyclo-steel, the process, although in its early stages, is regarded as promising. Formidable technical problems have, however, still to be surmounted.

Shipbuilders on the North-East Coast have a large volume of work in hand and extended order books that will keep their works busy for some years. But output is being kept down by the current shortage of steel, particularly of heavy plate and bars. A number of modernization programmes are being carried out,



The vertical line at 100 represents the national average level of retail trade for the latest month (April). Against this average the performance of each region may be measured



"Money is round and rolls away"

Italian Proverb

The fact that this thought is poetically phrased doesn't make it any the less depressing. In these days, as always, present prosperity is unfortunately no guarantee of future security.

In the Book of Genesis we read of the same problem. Joseph found the solution in Pharaoh's dream in which there were seven fat and seven thin ears of wheat. The thin ears represented the years of famine; the fat ears the years of plenty.

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including the provision of bigger berths, the installation of new cranes and the erection of plating, plumbers' and joiners' shops. The trend towards larger vessels will mean considerable capital expenditure over the next few years in improvements to ship repairing facilities—better quay accommodation, modernized engine works capable of dealing with high-class turbine and diesel installations, larger machines for dealing with heavy plates, heavier lifting gear and cranes, etc.

The reconstruction programmes of Swan, Hunter and Wigham Richardson Ltd., Newcastle-on-Tyne, have been retarded due principally to difficulties in the supply of steel. Their new prefabrication shed at Wallsend Shipyard should be completed by August. A second new berth will be finished this year but the installation of heavy cranes and the completion of crane tracks for this berth will extend into 1958. Other work in progress includes a new beam shed and shell plate shop, the laying-out of a third new berth and the provision of two additional electrical sub-stations. At Neptune Works a new deep-water quay is nearly finished and new platers' and prefabrication sheds are to be erected shortly. In May the firm's new dry dock was opened at Wallsend. The largest on the North-East Coast, it cost over £1 million to build and can accommodate oil tankers up to 45,000 deadweight tons.

Two ore-carrying vessels for the newly formed Vulcan Shipping Co., are to be built by Austin and Pickersgill, of Sunderland. Joseph L. Thompson and Sons, also of Sunderland, have received a £2 million order for two 10,000-ton cargo liners from the South American Saint Line. Machinery is being provided by William Doxford and Sons whose Sunderland shipyard has recently been awarded a contract worth £1.5 million for two motor ships for the Bank Line.

Busy conditions in the area are forecast in a new report, published by the North East Industrial and Development Association, with notable expansion in the **chemical, electrical engineering** and **electrical goods** industries. Progress, the report suggests, is likely to be particularly rapid on Tees-side where investment in the steel and chemical industries is continuing at a very high level. The Power-Gas Corporation, of Stockton-on-Tees, who have in recent years spent over £2 million in works development, are now expanding their South Works at a cost of £1.2 million. The new 175,000 sq. ft. of covered shop space should be completed by next summer. Layout was decided after the joint deputy managing director and the chief engineer had studied 32 different factories in Europe and the United States. A new £1.75 million factory at Grangetown, Middlesbrough, is being built by British Oxygen Gases. Compressed and liquid **oxygen**, and liquid and tonnage **hydrogen** are to be produced initially and fed by pipeline to I.C.I.'s Wilton plant.

Continued on next page



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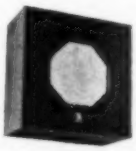
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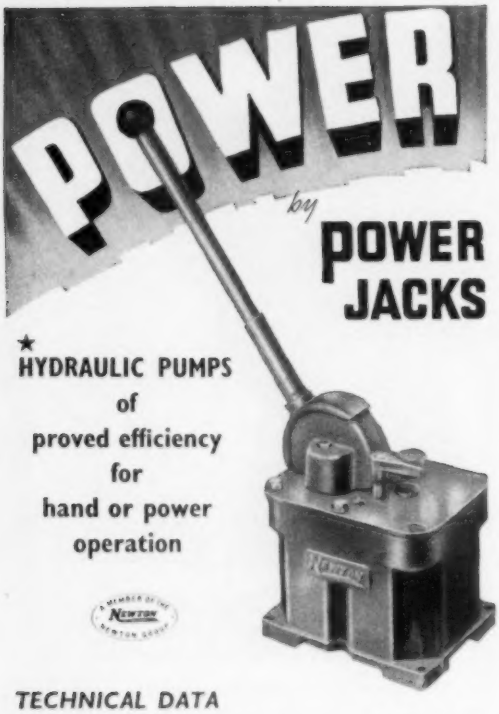
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ECONOMIC PROSPECT

Several companies in the area are playing important parts in the construction of the **three new commercial atomic power stations.** Head, Wrightson and Co., of Thornaby, who are to build new research reactors for Harwell, Dounreay and Australia, are associated with Whessoe, of Darlington, in the Bradwell, Essex, contract. The Tees-side Bridge and Engineering Works, Middlesbrough, are contributing to the Ayrshire coast station. Anglo Great Lakes Corporation, a new British concern formed to produce special quality graphite for nuclear furnace reactors, are to erect a £6 million manufacturing plant on a 78 acre site at Newburn Hough, on the River Tyne. The works, which are scheduled for completion in December, 1958, will have an initial output of 10,000 tons of nuclear quality graphite a year. Clarke, Chapman and Co., C. A. Parsons and Co. and A. Reyrolle and Co. are among the groups of firms supporting this new company. The constructional steel division of the Palmers Hebburn Works of Vickers-Armstrongs (Shipbuilders) Ltd. are undertaking all the constructional steelwork for the Berkeley atomic power station, in Gloucestershire.

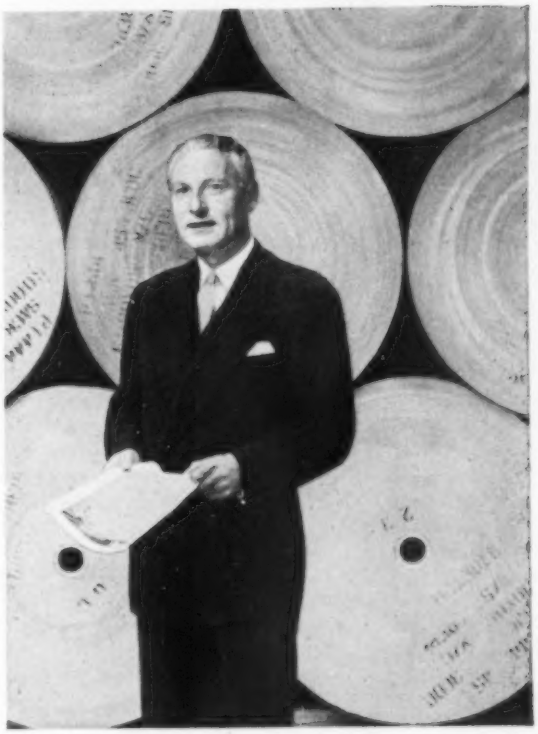
Reyrolle are extending one of the shops at their Hebburn Works to provide additional space and special facilities for the manufacture of reactor control equipment. The firm's research laboratories are also in process of expansion. The new machine shops at the Heaton West works of C. A. Parsons and Co. are now virtually completed.

Clarke, Chapman and Co., of Gateshead, have recently installed new plant for the production of spheroidal graphite iron which combines the metallurgical virtues of cast iron with the ductility of steel, and it is to be introduced into a number of their **marine** manufactures. With the firm's entry into the nuclear field additional and entirely new lines of research and development have become necessary, and to meet this need, Clarke, Chapman are now building a new research block which will house the development staffs and provide facilities for tests and prototype equipment covering the whole range of the company's products. Further works extensions are projected at the Newcastle-on-Tyne plant of Clyde Crane and Booth Ltd. The overseas interests of British Paints (Holdings) Ltd., of Newcastle, continue to expand. Work is now commencing on a new factory at Perth, Australia, and a new factory is planned at Newark, New Jersey, which will extend the company's **paint** interests in the U.S. beyond the marine field as at present.

I.C.I. are pressing ahead with a number of major development projects at Wilton where already some £60 million has been spent on new plants. At a cost of £8 million the Terylene plant is to be extended and by early 1959 will achieve an annual output of 30 million pounds of yarn and fibre.

How we try to be singularly plural

A STATEMENT OF COMPANY POLICY BY THE MANAGING DIRECTOR OF THE **REED PAPER GROUP**



"One of the most important problems facing industry today is that of reconciling the size of the large business with the initiative which is traditionally the hallmark of the small one. Once upon a time, it was said of us that we were 'a nation of shopkeepers'. But inevitably, of course, the more successful and progressive of the smaller businesses had to grow — both of themselves and by absorbing, taking over or amalgamating with others. The result has been to create a problem of *size* — of largeness for those concerns which have grown and grown and of smallness for those which have remained static.

"In the case of the Group (with which I personally am concerned) containing 19 separate producing and selling companies, the salient issue, I think, is one of how successfully to combine individual initiative with corporate strength. On the one hand, we have to make the resources of our largeness an asset — yet fight shy of red tape and 'remote control from the top'. On the other, we must see that the individual companies, while retaining their traditional enterprise and initiative, are not hampered from development through lack of capital and technical resources.

"The key to the problem, as I see it, lies with *people*. If the Group management is functioning efficiently — by keeping its eye on *overall* objectives and ensuring the recruitment, training and development of key personnel imbued with the right spirit of initiative and personal responsibility — the people who make up the Group will reflect this spirit by functioning efficiently at all levels. And I need hardly add, these good internal relations will also make for better external service.

"Our solution then, within the Reed Paper Group, is the maximum of decentralisation — with the Group management retaining *only* those functions which are vital for co-ordination and concentration of resources. The Reed Paper Group is an integrated, efficient whole . . . yet it is also 19 separate major companies concerned with every aspect of paper making and converting. Each of them, while having access to Group resources, retains its individuality and independence, and understands the character and aims of the Group so well that it can think and act *for itself*. To our customers and shareholders, we feel we may confidently say '*YOU profit from the initiative of each Company backed by the resources of the Group*'."

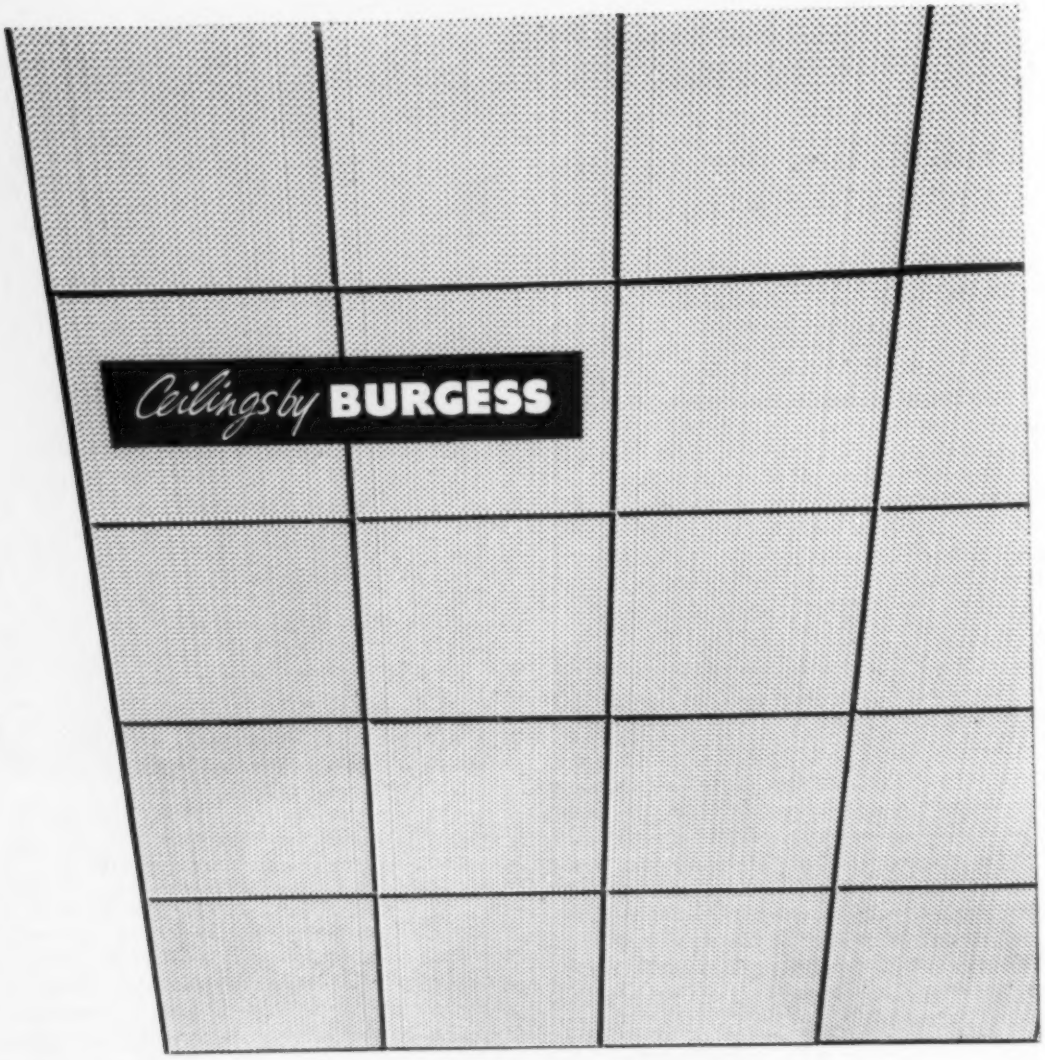
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EXPORT MARKET SURVEY

A Round-the-World Survey: Country by Country

INDONESIA

WHEN political calm once again descends on Indonesia, that rich group of islands spread over an area of 600,000 sq. miles and supporting a population of 81 million, its economic outlook could be one of the brightest in South-East Asia. Naturally fertile, the country has a favourable climate and industrious workers; its chief exports are rubber, copra, palm oil, tea, sugar and petroleum; and, overall, the productive capacity has an inherent tendency to expand.

At present, however, President Sukarno and his 'extra-Parliamentary cabinet of experts' are faced with the giant task of bringing unity to an archipelago where army leaders are in control of the main islands outside Java itself—Borneo, most of Sumatra, the Celebes, the Moluccas and the lesser Sunda Islands, which between them earn some 80 per cent of Indonesia's foreign exchange. Coupled with political calm, is the need to regain financial stability. Inflation continues to grow, and if the situation remains uncontrolled this year's Budget deficit is likely to reach a total of £180 million, a figure twice as high as last year's. The country's foreign reserves, too, are down to $158 million.

Nevertheless, despite current uncertainties it would be unwise to write off Indonesia as a market. It possesses resilience and great potentialities, and over the last few years British exports, particularly of machinery, vehicles, chemicals and textiles, have been growing. Whereas in 1954 they totalled £10.2 million, by 1956 the figure had risen to £16 million, and during the first quarter of this year exports were valued at £5.7 million, compared with £5.3 million in the corresponding period in 1956.

★ ★ ★

In the eight years of its existence Indonesia's leaders have made economic expansion their main aim. They have sought foreign economic aid 'without strings' and have, indeed, extended their trade contacts both in the East and in the West. Exports to communist countries have risen, particularly of rubber to Poland, and a Soviet-Indonesia aid agreement has been signed involving 11 projects in the country's five-year plan. A Russian mission is to carry out a search for coal and non-ferrous metals; and a credit agreement has been reached with Czechoslovakia.

At the same time the country has been receiving considerable Colombo Plan assistance, especially in the training of technicians, and business contacts with France, Italy and Western Germany have been strengthened. Six German geologists who have been surveying S. Sumatra and S. Borneo for iron ore, coal and bauxite are now preparing their report, and on their findings may depend the establishment by the Government of an iron and steel industry. German interests have planned to give technical assistance and credit facilities in starting basic industries such as chemicals, textiles, engineering, and shipbuilding, and are prepared to participate in joint venture companies with Indonesian groups holding 51 per cent of the shares. The United States—the country's best trading partner—has just granted a $15 million loan and promised a further $77 million for development purposes. The money has been earmarked for the construction of a 300-mile highway in Sumatra and the installation of diesel electric generating plants in more than 30 towns.

★ ★ ★

Indonesia's main long-term hopes for the future are centred in the projected five-year plan which is largely to be financed from normal budgetary sources, although some foreign aid and loans will be employed in the public sector. Priority is to be given to foodstuff production to meet primary needs, to foreign exchange earning projects and to the processing of raw materials. Improvement in living standards is to be achieved through a broadening of the base in the industrial and mining sectors and through diversification of agriculture. Forecasts for food crop output for 1957 are higher than for last year, and particular attention is being given to increasing the yield of rice—the staple diet.

Several large irrigation projects are in hand, including a multi-purpose scheme with dams at Djatiluhur and Tarum which will irrigate over 100,000 hectares of arable land and generate 350,000kW of electricity for industry, besides improving navigation facilities between Djatiluhur and Tjirebon. The Asahan Valley project will eventually produce 800,000kW of hydro-electric power for new fertilizer, pulp and paper and cement industries. During the past few years nearly one million miles of irrigation canals have been reconstructed, and work is still in progress on a 500,000 acre drainage scheme in S. Borneo. Inland fisheries are to

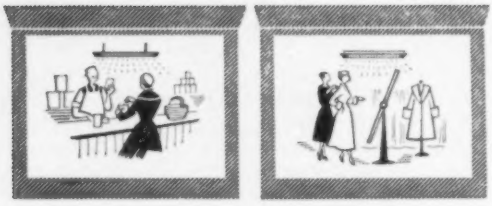
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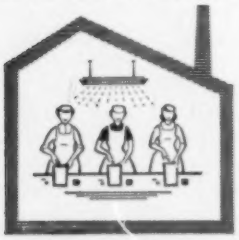


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ECONOMIC PROSPECT

be developed, and as a result of the motorization of the coastal fishing fleets the catch has been stepped up by 25 per cent compared with pre-war.

★ ★ ★

Although historically Indonesia's economy has been built round the pattern of primary commodity export, since independence a number of industries have rapidly been built up, and under the five-year plan 25 per cent of financial resources is to be devoted to expansion of industry and mining enterprises. Coupled with this drive is an intensification of technical training. A large number of research centres is planned and institutes are to be established for technical training in textiles, leather, ceramics and iron and copper products.

Private enterprise has been responsible for the erection of many new factories. A new Italian chemical works at Lembang is manufacturing anti-tuberculosis medicines, a new toothpaste factory has been erected in Djakarta and a cement plant at Gresik started production in May. Other new works include a £1 million textile mill at Surabaya, a flour mill in S. Celebes, a metal-working plant at Negara and new glass-making works. In West Java, brick, tile and tapioca industries are to be mechanized, prefabs are to be manufactured in S. Borneo, while in the Moluccas a new coconut oil factory is to be erected at Ambon and a building materials plant at Amake. To be finished next year is the Kota-Baru project, comprising a fish-meal works, cannery, drying and salting plant, training centre and net factory.

★ ★ ★

Encouraging progress is being made with the community development programme which was initially prepared with the help of Indian advisers. A training course for villagers has been started as the forerunner of an expanded scheme aimed at raising the level of village agriculture, industries, housing, sanitation and education.

A much larger social project is concerned with the wholesale re-settling of the country's population with the intention of opening up new agricultural areas and developing new industry in a more uniform manner throughout the islands. Although Java only represents 7 per cent of the whole surface area of the archipelago it houses at present two-thirds of the Indonesian people. The Government plan involves the movement over the next year or so of some 500,000 people to other islands, a transfer which will involve the clearing of nearly 500,000 acres of forest and a considerable amount of road and house construction.



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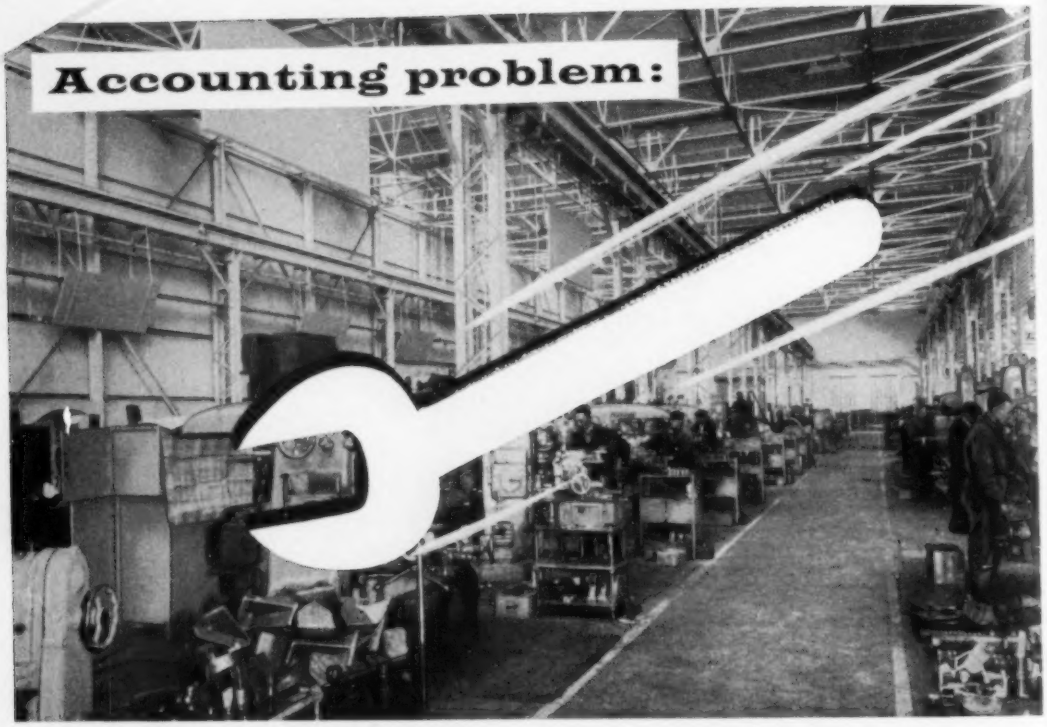


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INACCURATE INFORMATION WAS THROWING A SPANNER INTO FRASER'S WORKS!

DOUGLAS FRASER AND SONS LTD., a firm of Scottish engineers specializing in the manufacture of textile machinery and machine tools, used to keep their Store Records on Bin Cards. These cards only showed the materials purchased and those issued to production. Every six months, stock was checked against these Bin Cards—there were always a number of discrepancies. Because no *net* balance was registered on the Bin Cards, Fraser's often found they didn't order enough new stock to cope with production requirements. This was happening at a time when demand was increasing and materials were taking longer to arrive anyway.

Like many firms, big and small, faced with this kind of problem they called in Burroughs

SOLUTION: In close co-operation with Fraser's own staff, the Burroughs representative worked out a system based on four machines—two Sensimatics, one Director Adding Machine and one Duplex Calculator. As a result the firm now gets a daily balance of all its stock items. Also during the posting operation the order level is automatically registered. Re-ordering became mechanically accurate, production programmes go through smoothly, and no extra staff were taken on at all.

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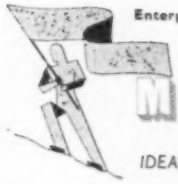
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MARCH OF BUSINESS

IDEAS AND ACTIONS OF FORWARD-LOOKING EXECUTIVES

DISTILLED WISDOM

MOST businessmen recognize the superiority of the group discussion over the conference or seminar at which prepared papers are followed by a period of stilted questions and answers. But it is seldom that the results of such discussions are published widely. The wisdom—and the mental stimulation—which they produce are generally confined to the handful of people who take part.

This is one reason why BUSINESS is organizing a series of after-lunch discussions at which small groups of executives and others will give considered views on matters of exceptional interest to all businessmen.

The first discussion is reported fully on pages 69-76 of this issue. It deals in a very practical way with the subject of 'making managers'. The team of speakers do not postulate on the facilities which *ought* to be made available at universities and other training centres. Instead, they direct their attention to the ways in which the individual—the young man who aspires to be a manager, or the experienced manager who seeks promotion—can acquire and develop top management qualities.

The team is not composed of people who specialize in lectures or discussions. The aim was to bring together a group of senior executives who would contribute fresh ideas from their own experience in different jobs and different industries.

The chair was taken by Lord Piercy, chairman of the Industrial and Commercial Finance Corporation. His wide range of interests has brought him into close contact with vocational guidance and education; among other things, he is president of the National Institute of Psychology, a governor of the London School of Economics, a governor of the Regent Street Polytechnic, and a member of the Court of the Senate, University of London.

It is not the intention to restrict future panels to businessmen. Where appropriate, BUSINESS proposes to call in men whose experience in other fields will enable them to make significant contributions to the subject under discussion.

The report which begins on page 69 raises points which no ambitious executive can afford to ignore. For this reason, BUSINESS invites readers to make their own contributions to the discussion. By completing the reply-paid card which faces page 80 of this issue, they can indicate the types of training which in their opinion are most suitable to the needs of modern management.

★ ★ ★

An excellent guide to the East African market has been issued by Barclays Bank D.C.O., 54 Lombard Street, London E.C.3. Simply and concisely, it gives details of purchasing power; the market for capital goods; the market for consumer goods (European, Asian and African); the import trade; the financial background; and the Kenya emergency. There are some first-rate maps and charts, plus a photographic section.

★ ★ ★

COVER PICTURE STORY

THE colour study on this month's front cover was taken for BUSINESS by John Searle Austin at the glass laboratories of the General Electric Company's Research Division, Wembley.

The operator is heating the wall of a vessel. When it reaches the correct temperature, he blows through a tube, causing a bubble to form where the heat on the glass is most intense. When the bubble is smashed, the tube on the right can be inserted into the vessel. Further heat is applied



until the joint is perfect, accurate breath control by the operator ensuring that the correct diameter is retained.

This process is one of the many aspects of craftsmanship still necessary in the industries which 'feed' modern science.

★ ★ ★

Durham University is making an exceptional effort to meet the call for more scientists and technologists. It is now embarking on an expansion pro-

Next Month

CAN TRANQUILLIZERS EASE EXECUTIVE STRAIN? Pros and cons of the new 'one up' pills.

DECIMAL ACCOUNTING. How it simplified a small firm's stock control and invoicing procedures.

gramme which aims to raise the total number of places from 1,300 *to* 2,000. *Of this increase, all but* 100 *places will be for science students, raising the present figure from* 400 *to* 1,000.

Outside Oxford and Cambridge, Durham is the only British University which is both residential and collegiate. This means that it has a special part to play in the drive to train more scientists. It also means that it has special financial problems.

To provide new buildings, equipment and residential quarters for the expansion programme will cost at least £2,000,000. *A 'pump-priming' appeal for* £250,000 *was launched a few days ago.*

★ ★ ★

Computer Planning

LAST month's opening article described how the Morgan Crucible Company prepared for the installation of a small electronic computer. It emphasized the company's insistence on two points—that preparation was a long and difficult job, and that the plan should be based on the computer's ability to pay for itself from the outset.

The same points were made in a paper which E. M. Renals of the Ford Motor Co. Ltd., delivered at the recent National Cost Conference organized by the Institute of Cost and Works Accountants.

Ford have no computer at present. But for some time a large slice of their 17,000-strong payroll has been handled on a service basis by one of the *Leo* machines at Cadby Hall. Within the next 12 months the whole of the payroll will be 'computerized' in this way.

By then the company will have installed their own machine. This will take over the payroll and, in addition, will handle a large stock control and sales accounting procedure. Eventually the two jobs will occupy the computer for about 50 hours a week.

Since the machine will be operated on a two-shift basis, five days a week, there will be some spare capacity for contingencies and further developments. The company are now completing a specification for a consolidated production control system which covers production planning, purchasing, cost accounting, and accounts payable.

How much work has gone into the planning of these operations? Mr. Renals gave the following details in respect of the 'service' payroll application: For the development of a job requirements statement, about 12 man-months; for programming and trials (which were handled by experts as part of the service contract), about eight man-months; for planning and supervising the change-over, about one man-year.

The payroll programmes comprise some 9,000 instructions. About half of these are concerned with the wide range of statistics and analyses required by the company's labour relations department. The rate of changeover which, from a clerical point of view, can be handled comfortably is about 2,000 employees a month. Each take-over 'block' is run in parallel with the existing punched card system for one week, mainly to ensure that all information has been transferred correctly. The stock control and sales accounting job—now being programmed—will probably have taken seven man-years when it is finished.

The Morgan Crucible Company have set a time-limit of five years on the first stage of their computer project; during this period they expect to recover the capital cost of the equipment. Mr. Renals believes that it is reasonable to base economic studies on a ten-year life. In his paper he says: "The danger is that if this factor of obsolescence is over-stated and the computer is allowed only a short effective life over which to allocate capital costs and related expenses, a wrong policy decision may be made because of the apparent poor return on investment."

★ ★ ★

Businessmen who are continually on the move will welcome a new 'drip-dry' nylon shirt. The material, based on a process perfected by an American textile group, displays none of the drawbacks which many people associate with nylon—it is soft, warm, absorbent, and not noticeably transparent. Marketed under the name 'Goodwood', the shirt is available in pastel checks as well as in white and cream.

★ ★ ★

Wasted Brains

"THE British Scientist has brilliant ideas—but it is the American manufacturer who exploits them." This is a criticism which the Press and the man-in-the-street are continuously throwing at British industry. To what extent is it justified? Since 1952, a team of scientists, economists and others have been trying to find out.

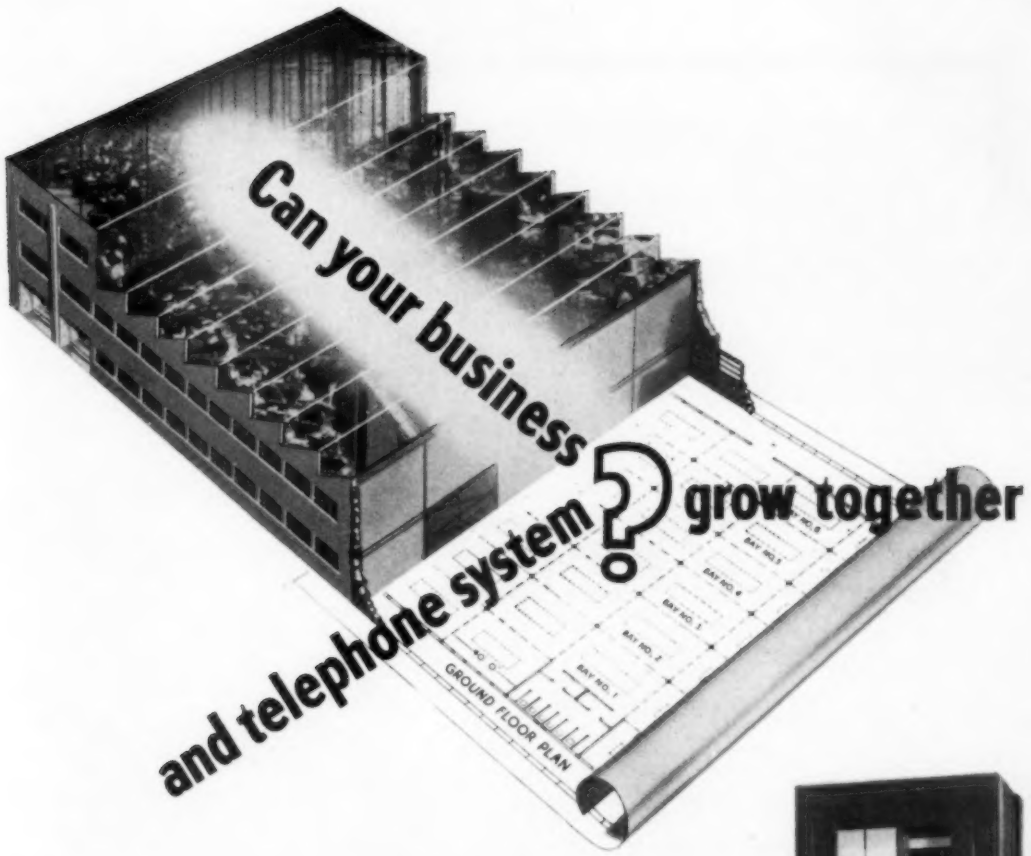
Their report* has now been published. It is reassuring on some issues, and disposes of a few misconceptions—but much of the criticism is confirmed.

The broad conclusion is that British industry "is not universally backward in scientific matters". As a pat on the back, this is hardly enthusiastic, and it is quickly followed by a number of well-placed kicks. For the investigators conclude that the gap between the best and the worst firms is unnecessarily wide.

They say: "We found many firms which need fear no comparison with similar firms anywhere in the world; but we have also found firms which have shocked us by their ignorant complacency. Although all countries must expect to have some unprogressive firms, we do not think this justifies the parochialism of large tracts of British industry".

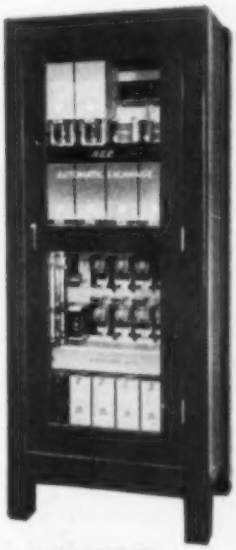
It seems, moreover, that the gap between good firms and bad firms is still widening. This is because 'technical progressiveness' is a paying proposition: thus the good firm can attract the resources it needs to become more progressive and more profitable. On the other hand, backward firms and backward industries are ill-placed to command the resources and capital they would need to make progress. The investigators' verdict is that it "will take much ingenuity by industry and govern-

* "Industrial and Technical Progress." C. F. Carter and B. R. Williams. Oxford University Press. 25s.





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ment to break up the crust of habit and to divert lively and able minds from the places where change is most likely to those to which it is most needed."

In the team's opinion, 'red tape' —one of the industrialists' favourite whipping-boys—does not seriously impede progress. Indeed, the report says that the effect of Government action is favourable to the speedy application of science. It also disagrees with the popular belief that high taxation is a serious discouragement.

The interdependence of firms is emphasized. Suppliers, it is said, must stimulate their customers to provide technical service; manufacturers must encourage the development of new raw materials. For this reason, the report maintains that the complacency, ignorance or secrecy of one firm may endanger the progress of a whole chain of firms.

★ ★ ★

"Britain has produced superlatives in every sphere. Our scientists are second to none and we need have no inferiority complex about the skills of our industries. Nevertheless, we hear far too often of some flourishing enterprise that springs up overseas, based on ideas or discoveries which were originally made in British laboratories.

"Why should this happen? I do not think the answer lies in high finance or in sheer apathy. But I consider that there is a gap in our industrial relations. The gap lies between the pure scientists on the one hand and the industrial producers on the other. We are short of men who can interpret the discoveries of science into real processes on the factory floor." E. C. Stevens, managing director, Skil Engineers Ltd., at a recent meeting of the Incorporated Plant Engineers.

★ ★ ★

Directors at School

"IT would be a mistake", says one of the speakers in the BUSINESS Discussion Panel, "to consider training for management as something which is ever finished." Obviously

PEOPLE

PRODUCTS

PLACES 1

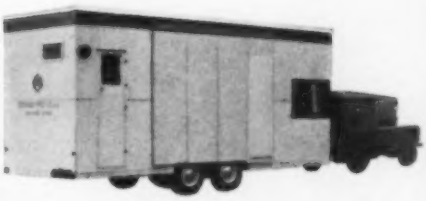


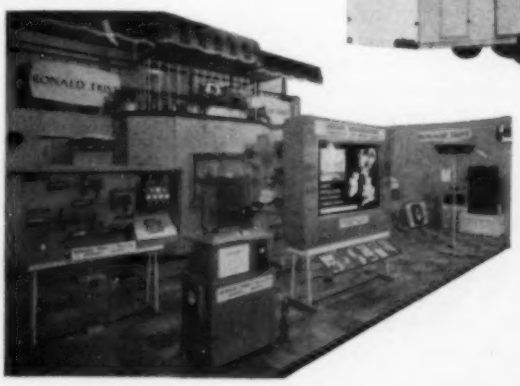
QUICK WORK—Shell, floors and windows of this 10-storey block of flats were built by William Thornton and Sons Ltd. at Birkenhead, Cheshire, in only 19 days. The firm used a Sewdish 'moving form' method of construction for which they hold sole rights in Britain.



BIF IN THE BALANCE—As newly-elected president of the Birmingham Chamber of Commerce, Philip Bache, 49, is playing a leading part in shaping the future of Birmingham's BIF. He is managing director of Geo. Salter and Co. Ltd., and has long advocated internationalization of the Fair. "I am convinced it could achieve trade supremacy in Europe," he says.

EXHIBITION HUSTLE—This mobile exhibition unit recently allowed Ronald Trist and Co. Ltd., Slough, to move a double-decker stand from Earls Court one Saturday evening after closing time, and re-erect it by opening time on Monday morning at Olympia.





the Institute of Directors share this opinion. For they have launched a series of one-day courses at which I.o.D. members—primarily the managing directors of small firms—will have an opportunity to discuss and review the functions for which a board of directors is responsible.

The theme of the first course was 'Forward Planning'. It was organized in collaboration with E. L. G. Robbins, the Ford Motor Co.'s organization adviser.

The subject was presented in a particularly effective form. First came a talk by Mr. Robbins on the way in which planning is co-ordinated at Ford's. This was used, in effect, to put under a magnifying glass the planning problems and responsibilities which, in a smaller organization, are not so easily identified. Mr. Robbins emphasized that big-firm principles can be applied in businesses of all sizes.

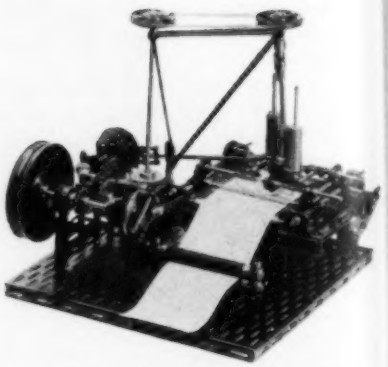
He was followed by three speakers who dealt with progressive stages of forward planning: the design, development and manufacture of a new product; the expansion of manufacturing facilities to supply a growing market; and the control of costs and prices in line with a predetermined plan. Case-studies were used in all cases.

Because of lack of space, the Institute had to refuse two-thirds of the 250-300 members who applied for tickets. The actual attendance was in the region of 70. About 50 of them stayed to the end.

How did the directors react to their day 'at school'? To measure their response was difficult in many respects, because discussion time was limited to between 10 and 15 minutes at the end of each paper. Moreover, there is a tendency in courses of this type for 'discussion' to consist of a series of self-contained questions which scarcely reflect the feelings of the course as a whole.

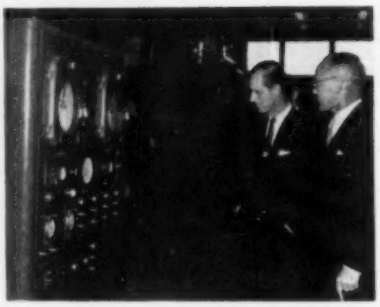
Nevertheless, there was plenty of evidence that members were well satisfied with the opportunity to learn how other firms tackle both familiar and unfamiliar planning problems.

PEOPLE PRODUCTS PLACES 2

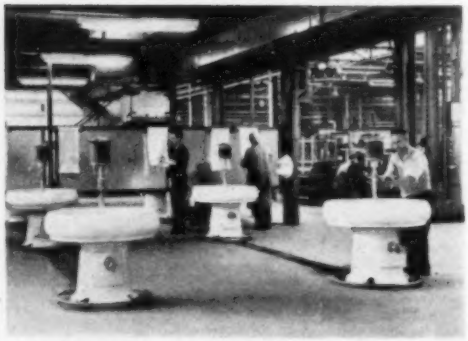




MODELS TO ORDER—Working models of almost any kind can be made with this FAC construction kit. Based on the 'standardized' part principle, kits contain a selection of most machine elements —gears, drive-shafts, bearings, etc. Model shown here was made entirely from a FAC kit, and was used for life tests of ballpoint pens. British agents are Weyco (Sales) Ltd.



OUTPUT DOUBLED—The Duke of Edinburgh started a new machine at Kimberly-Clark Ltd., Aylesford, which will enable the firm to double their output of cellulose wadding. A new range of tissue products is to be marketed, including wiping cloths for industry and paper aprons for counter-hands. With the Duke is managing director Jock Cameron, subject of a feature in the May issue of 'Business'.



ALL TOGETHER NOW—New extension to the St. Helen's Auckland factory of Westool Ltd. features a complete break with tradition—washing and toilet facilities in the centre of the production area. Wash-basins are visible from most parts of the factory, and are used by both sexes. But the firm report that the arrangement works well, causing neither embarrassment nor resentment.

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IF 7035	Overcoming Objections	3	£3.0.0.	£50.0.0.	30 mins
IF 7039	Presenting Your Sales Case Convincingly	3	£3.0.0.	£50.0.0.	30 mins
IF 7036	Closing the Sale	3	£3.0.0.	£50.0.0.	30 mins
IF 6170	We Who Sell	1	Free Loan	Not available for outright purchase	19 mins
IF 7037	The Bettger Story	3	£3.0.0.	£50.0.0.	30 mins
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THE STRAIN ON TOP MANAGEMENT
Is a Forced Rest the Answer?

THE current enquiry into the physical and mental 'erosion' of Ministers of State draws attention to a question which also concerns top-level policy makers and executives in the business world. How much responsibility is it reasonable to expect one man to carry?

As the ebullient Mr. Shinwell has suggested, a lot depends on the make-up of the individual. One man may thrive under a burden which would put another man on his back. Yet in different circumstances, involving different types of responsibility, their positions might well be reversed. It would be difficult to draw up a plan, or even a method of measuring the 'bearability' of work loads, which would act satisfactorily in all cases.

For this reason, British businessmen would probably look with disfavour on the sort of scheme which was recently put into operation by an American firm, Bart Schwartz International Textiles. From now on, this company's senior executives will be compelled to take a week's holiday (on full pay, of course) every seven weeks. The aim, apparently is to reduce the incidence of heart conditions and ulcers.

Whether the scheme will have this effect is another matter. There is, perhaps, a danger that the burden of clearing up loose ends before each compulsory holiday (if only from a fear that subordinates will find out the bosses' sins or omissions!) and of picking up the ends again after the holiday, will produce some ulcers on its own account.

Many executives do their best work under steady pressure. Starting up again after a rest requires extra effort. So, paradoxically, does the 'unwinding' process before a rest.

But at least the Bart Schwartz scheme should have a useful by-product: the periodic absence of senior men will give subordinates more chance to shine. Often a man's ability to stand up to responsibility can be measured only by giving him greater responsibility to stand up to. This point is made forcefully by one of the executives who took part in the BUSINESS Panel Discussion reported on the following page.

Profit and Loss

HOW will reductions in Britain's Defence Programme affect industrial research and development work?

One result, of course, will be a temporary alleviation of the shortage of scientists and technicians. Boffins released from 'axed' defence projects will be driven to seek employment in strictly commercial enterprises.

The electronics industry is one which will certainly be affected on this way. At present defence work accounts for more than half of its output.

But although management as a whole will 'benefit' from the re-allocation of scientific manpower, it will lose considerably in other ways. For the development of many of its newer 'tools'—electronic data-processing, for example—has been accelerated by research work supported either wholly or partly by defence contracts.

This is true even outside the field of equipment and components. New techniques like operational research and ergonomics are largely the outcome of work carried out for military purposes.

Crystal Ball—1

A "typical industrial pattern" of ten or 20 years ahead was pictured by automation expert J. A. Sargrove when he addressed a meeting held jointly by the Institute of General Managers and the Institution of Commercial and Industrial Managers.

It consisted of several mass-production factories grouped around a small, highly competent servicing firm.

The factories, said Mr. Sargrove, would work round the clock. Rather like a fire brigade, the servicing firm would be ready to go to their rescue immediately in the event of plant breakdowns.

Another of the servicing firm's activities might be the manufacture of maintenance equipment.

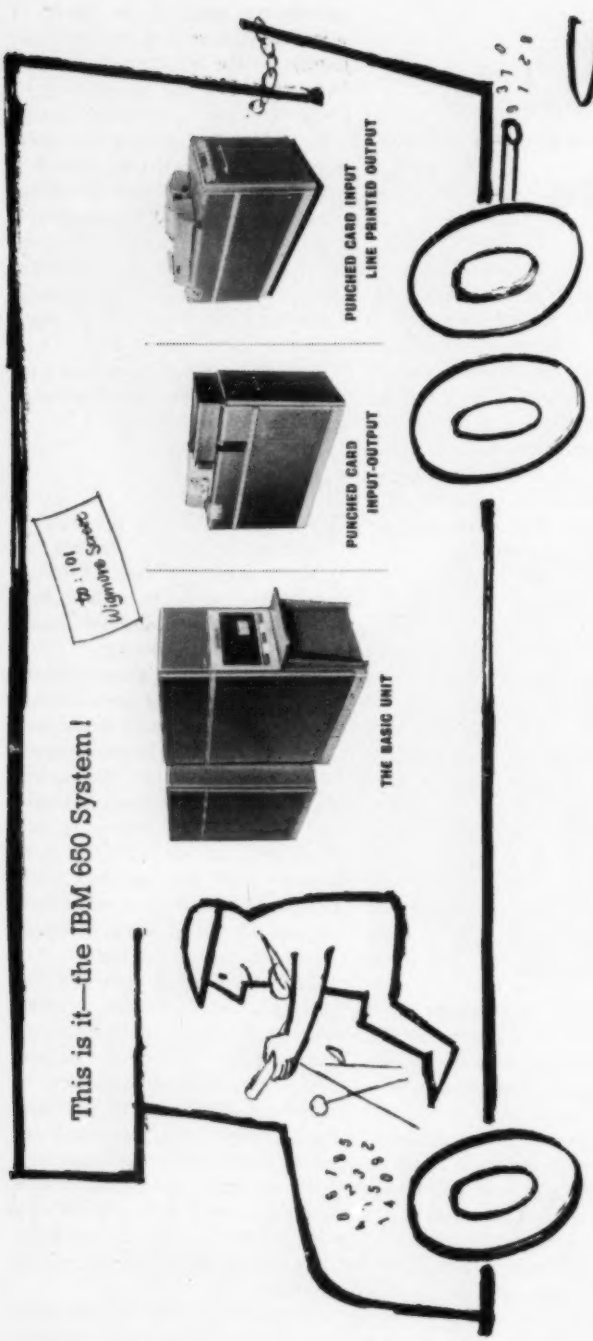
Crystal Ball—2

TWO developments in the world of accountancy were forecast by J. M. S. Risk, the Brush Group's controller of accounts, at the Chartered Institute of Secretaries' annual conference a few weeks ago.

One was that the trend towards greater disclosure and more informative company accounts would continue and probably become accentuated. Said Mr. Risk: "Slowly but inevitably the Government will find itself drawn to the conclusion that the country cannot afford to have accounts which are other than in line with the best commercial and industrial practice. This will take time to accomplish but it must come."

The other forecast was that the status of the accountant himself would be revolutionized by electronic book-keeping. "It seems", said Mr. Risk, "that a relatively new form of animal life will appear on the landscape. Indeed, I think that there are one or two to be seen moving around at the present time—the experts in electronics who will manage the administrative nervous systems of the future, with or without the help of the accountant.

"Either the accountant will retire gracefully to a back-room to mumble over his mysteries and display a lock-fast private ledger as a symbol of his superiority; or a fragmentation of the accountancy profession will take place and a special qualification will emerge to cover the needs of data-processing."



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The Way to the TOP

A 'BUSINESS' PANEL DISCUSSES

- **Who Holds the Advantage—the Arts Graduate or the Scientist?**
- **How Can the Individual Manager Prepare Himself for Promotion?**
- **What Sort of Help Should He Get from his Firm?**

THE PANEL

LORD PIERCY *Chairman, Industrial and Commercial Finance Corpn. Ltd.*

W. R. SPENCER *Director of Training, Urwick, Orr & Partners Ltd.*

J. GEOFFREY McLEAN *Managing Director, John McLean & Sons Ltd.*

W. I. SIBBALD *General Sales Manager, S. C. Johnson & Son Ltd.*

H. N. KEEGAN *General Works Manager, Yardley & Co. Ltd.*

F. LANDMANN *General Manager, S. C. Electric Ltd.*

R. WHITE *General Manager, Percy Boyden & Co. Ltd.*

Here is a report of the first of a series of after-lunch discussions organized by BUSINESS. In it, a panel of experienced executives examine the subject of 'making managers' from a very practical standpoint: How can the individual, using facilities which are available today, acquire and develop top management qualities?

The panel encompasses a wide range of experience in different fields. The names and present positions of its members appear above.

Before they met, each member was given a brief which narrowed the subject to four specific issues:

1—Which type of initial training provides the more suitable background for general management—arts or science?

2—Is job-rotation (either in a company scheme or on the individual's own initiative) better than specialization during the early stages of the career?

3—What are the relative advantages of 'appreciation' studies and more specialized forms of learning as a means of further development?

4—How far is executive development the firm's responsibility—and how much is it up to the individual?

Opening the discussion, the chairman, Lord Piercy, said:

I am alleged to have said that "managers, relatively speaking, are scarcer than scientists and much more difficult to train". That may or may not be true, but the subject we are on today is a very important one and it is concerned with how you make a manager—not the whole of the story but a very important part of it.

Now you have had this brief which divides the subject up into four topics. It is a logical arrangement. The first three points take the manager's career in a developmental order; there is the initial period, there is the middle, and there is the refresher phase. And finally we are asked to consider the attitude of his firm towards his own efforts to develop his abilities.

The first topic concerns initial or educational background. I observe that it starts with the assumption that the manager will be a systematically educated person. Whether this is how it works out in practice is another matter.

Might I ask Mr. Sibbald to start

off on the first topic—*Arts versus Science or Technology as an Initial Background.*

MR. SIBBALD: Thank you Lord Piercy. I am impressed that this question of 'Arts' versus 'Science' should be the first item. I feel that it is going to become more important in the future. The tendency is going to be more towards specialization, which one can perhaps ally with science and not with arts.

But certainly the tendency *should* be to develop the mind. For in top management it is going to be more necessary than ever to have a pretty large body of people with a wide grasp of the whole position and not a tendency to become introvertive, seeing from just one specialist point of view. So my feeling is that the stress should be on the arts, though the whole concept of the arts degree should probably be re-examined.

MR. MCLEAN: I think that in an increasingly scientific society it is essential the manager should have technological skills. But a lot of criticism could be raised against the present training at the universities in this field, because they tend to put management subjects in the shade.

The whole background of scientists should be looked at because there is a tendency to make them think of their training as a vocation, and to develop some sort of intellectual snobbery about the pursuit of science. They want their employers to keep them in that channel, so consequently they become less and less able to handle human beings, which I think is about the only advantage that the arts student has. The scientists have too rigid a training. I certainly suffered from that myself at Birmingham University.

MR. SPENCER: In general, I would agree with Mr. Sibbald. But we really need a combination of arts and science which the universities, as yet, have not achieved. A manager, in my opinion, has got to be a scientist and a philosopher. There is not yet, apart from one or two universities who are making pilot experiments, a business degree for a man studying for management.

When a young man is starting out, there are devious ways by which he may reach the top. According to the Urwick White Paper, 70 per cent of today's top managers started out in some specialized field. And even in a specialized field, there is line management. You sometimes have, for example, an accounts department with some hundreds of people under the accountant. So we should be thinking about management as an ingredient in the job of anybody responsible for the activities of others. I put my weight in favour



LORD PIERCY
"The human problems of management are the most elusive"

of a mixed course in the preparation for management responsibility, a mixture of science and the arts.

MR. LANDMANN: In my opinion it does not matter two hoots whether managers train in arts or science or technology. What we must examine are the characteristics we want in future top managers, and therefore the direction in which a man must develop his mind, his attitude, his philosophy.

Serious Danger

Also we do not want to create a group of stereotype managers, and there is a serious danger of that. Not so long ago I could tell managers of a certain well-known company after I had talked to them for two or three minutes. They were trained and shaped in a certain way which showed. I do not think that it was a good thing generally to develop managers to one rigid pattern. Originality and independence of thinking play a very important part, and provided these basic characteristics are there in the individual, and provided the initial type of training is capable of developing them, the training can be in arts, science or something else.

MR. KEEGAN: I would agree that it does not matter whether a university graduate is a scientist or an arts man. What matters at a university is not so much the subject studied as the contacts, at a formative stage, with people who are experts in their fields and the discussions outside classes with those who, like oneself, are trying to become experts. But the potential manager should pay some attention to science. I think that rather fewer are knowledgable about science than about some facet of the arts. And in management these days it is important at least to appreciate many of the scientific and technical trends which are developing so rapidly.

MR. WHITE: I come down very heavily on the side of the scientifically trained men. My own experience has been that the arts student certainly has clarity of thought, but when he is put into an industrial environment he is handicapped because he has no science and thus is incapable of making a decision or has great difficulty in doing so. After all, industry is chiefly concerned with the sciences and he must know the way in which his servants—the scientists in very many cases—think.

Most of the scientists with whom I have come into contact are by no means ignorant of philosophy or the arts. Usually by the time they are 40—by the time they get their first directorship—they are mature people with considerable breadth of vision. But I have in mind a group of five young men starting off as trainees. Two were part-time technological students at the Polytechnic, two were arts graduates and the other was purely a management trainee. In very quick time the arts men had fallen out—because of their great breadth of vision, if you like. They could not concern themselves with the very mundane matters with which a general factory manager has to

concern himself. So I would say that the industrial general manager must start off as a scientist.

LORD PIERCY: To sum up quickly, it seems that two speakers came down on the side of a scientific training—one most definitely. Two were in favour of a combination of arts and science, and two were in favour of "developing the mind".

But I rather wonder if this is not getting back to the old British predilection for the 'gifted amateur' (laughter). The old-fashioned public school and university training is part of that. Does anybody really hold the view that management can be recruited from gifted amateurs?

MR. MCLEAN: When I came down heavily on the side of the scientist, I was looking at it as if there were solely a choice between the science graduate and the arts graduate. But I am completely with Mr. Landmann that the field is by no means restricted to those people. Management can come from anywhere.

If it is a choice between those two, then providing one can keep the scientist away from being too much of a scientist, he can make a good manager. But I believe you can make a good manager out of anyone, providing he has the necessary breadth of vision to collect all the necessary information, look at it, decide on what he is going to do and then get people to co-operate in doing it.

MR. LANDMANN: Certainly the top manager need not have technological skills—in fact I think he should not. It would make him biassed. His function is to co-ordinate and integrate all the specialized activities. Why pick on the scientific or technological one, even if the product happens to be technical?

MR. WHITE: I think that is getting a little off the subject. We are surely asked to say in what way would we train young men for management. I would say quite definitely, train them first as scientists.

LORD PIERCY: I should just like to get clear on one or two questions. First, how many of us regard a university training of some sort as at least very advisable for a candidate for management? Let's have a show of hands. (All agree, except Mr. Sibbald.)



W. I. SIBBALD
"We need an entirely new training programme—the old ideas no longer fit

MR. LANDMANN: Advisable, but not essential.

MR. SIBBALD: I also agree, if you make it advisable but not essential.

LORD PIERCY: My next question is this: Supposing that a university education is desirable, what should the student read? Something like Modern Greats, where he is occupied mainly with Greek philosophy and language, or something like engineering? How far should his studies be from the practical world or how near must they be?

MR. MCLEAN: I think that if we are looking from the point of view of the young man who is wanting to get on, we should advise him to take an arts degree because it will enable him to 'flannel' more people for a longer time than if he trains to be a scientist. (laughter).

MR. LANDMANN: From the point of view of preparing him to become a top manager, it does not matter. The advice that I would give to my son if he were preparing for such a career would be: 'You do what you enjoy doing—what it is your inclination to do. It will help to prepare you for being a good top manager, whether you choose arts or engineering. But do not choose it by the criterion whether one or the other is the way to top management'.

Arts v Science

PRO SCIENCE	*"Industry is chiefly concerned with the sciences. The manager must know the way in which his servants—the scientists in many cases—think."*
PRO ARTS	*"In top management it is going to be more necessary than ever to have people with a grasp of the whole position—not a tendency to see from one specialist viewpoint."*
PRO SCIENCE	*"The young man who wants to get on should take an arts degree. It will enable him to 'flannel' more people for a longer time than if he trains to be a scientist."*
ANTI ARTS	*"The top manager should not have technological skills—they would make him biassed. His function is to co-ordinate all specialist activities."*
EITHER	*"You can make a good manager out of anyone provided he has the breadth of vision to collect all the necessary information, look at it, decide what he is going to do, and then get people to co-operate in doing it."*
BOTH	*"We need a combination of arts and science which the universities, as yet, have not achieved."*

LORD PIERCY: I think we should leave it at that. Mr. Landmann has emphasized the point already made by Mr. Sibbald, that it does not matter much what you study so long as it develops the mind.

Well, our next subject concerns the training that a budding manager should get. *Should it be 'rotated' training, taking him through various aspects of the business, or is it more advisable to start in a specialized occupation*?

MR. KEEGAN: I have had some experience of watching others rotate—arts graduates, mainly from the older universities. And I do agree with the definition that it so easily becomes 'going around in circles'. I have found it extremely difficult to convince a man that spending say six months in a department, looking over someone's shoulder or doing the odd little jobs that he can to make himself useful, is in fact a training. I think that in addition to training a mind, we have to train a character. And the latter can come only from accepting responsibility. Not, of course, from overloading the individual with responsibility at the beginning because I do think that it takes 12 months, if one has to put a time on it, for a man to become acclimatized to industry—that is, to a group of people working together.

Right 'Climate'

I feel that rotating is part of the answer, but one should create a climate in which the man can develop himself. That is, he should be given a fair freedom of choice of the department into which he moves. But he has to go from success to success. Having made a success of one job, he can move forward from that, rather than be moved arbitarily from one job to another.

LORD PIERCY: Those seem to me rather wise remarks.

MR. SPENCER: I would say that the most reasonable advice that should be given to a young man is to attempt to plan his own career and keep control of that planning. The present tendency of the large firm is to have so-called management training schemes which tend to do to management trainees what the Welfare State tends to do to all of us—that is, leave the responsibility to someone else.



H. N. KEEGAN

"The problem is to find able men for the places which do arise."

The man is given a training plan, which is a kind of injection in the arm to keep him quiet (laughter) and when he is about 35 or 40 he begins to feel that he has not done what he wanted to. I would stress that, right from the start, he must himself have a clue as to where he wants to go and must try to use all the training facilities available in the process.

MR. LANDMANN: I agree with both Mr. Spencer and Mr. Keegan, but I would go further. Faced with the question: 'rotated' training versus a specialized career, I would say a specialized career. Only a specialized career will give a young man from the start the opportunity to do something specific—and that, I think, is one of the very essential parts of the training—from as early as possible.

Early Responsibility

The sooner a man gets something to do which gives him the chance to make decisions, to get the feel of responsibility (and incidentally to give the people who watch his progress the opportunity of judging how he takes responsibility) the better for his development. Rotating, in the sense that we know it, doesn't give him that. A specialized career can.

MR. MCLEAN: I agree that this idea of rotating people on a fixed programme is bad. On the other hand I'm against specialization because too often, particularly with a science student, it becomes specialization in a very, very narrow field. I think that what is needed is a deliberate loading up of the man with responsibility, so that his main experience comes not in his technical work but in the actual work of managing.

MR. SIBBALD: This is a subject very dear to my heart. We have about 30 executives, all of whom have been trained up within the company. I am continually amazed by the successful results when you do give a man added responsibility, but you have got to know a good deal about him first.

Coming to a more personal field, I have a son, almost 21. He made up his mind he was going to become an engineer, so I apprenticed him to a well-known company. They have a rotating plan, but it has a good deal of flexibility as to how long an apprentice stays in each department. That is never determined until he has been in it for a certain length of time. Whether he should go back again is also determined during the course of his career.

The company also have committees which give these boys a chance to get a taste of management. For the last two years my son has been on a committee which includes the works manager. This work enables the boys to see the broader aspects of a management. Now, of course, my son wants to re-organize the whole company (loud laughter), there are so many things wrong with it. But the system develops the thinking faculty and a determination to probe into every aspect of a job.

MR. WHITE: We have been talking mainly of the larger firms where you can get full and adequate rotation. But the majority of young men have got to get their broadening experience in smaller firms. They can only do that if there is a preconceived idea and a planning of their career, such as was brought out so well at the beginning of this discussion. They have got to know where they are going and I think they have got to be able themselves to choose the points of rotation.

LORD PIERCY: Everybody agrees—and I think this is very important—that responsibility should be undertaken early; moreover, that responsibility should be combined with various means of giving the trainee a sight of what you might call the 'hair springs' of the firm.

Our third point deals rather with the later stage of an executive's career, when his responsibilities are rising. *What are the means of giving him any further qualifications or accomplishments that he may need? The brief distinguishes between appreciation courses and more specialized studies.* Who'll begin on that one?

MR. SPENCER: The first thing a young man aiming for management responsibility should learn is how to live in a business community. He has got to understand what organization is, the need for a definition of responsibility, and how the other functions work as well as his. Therefore I think that as early as possible he should progress from studying the background subjects in the Urwick report—which show him why we have some of our present problems—into the next stage, which involves studying the organization of the individual business—the various functions and so on.



R. WHITE
"Men of 35 to 45 need something to stimulate them. Their minds are stodgy."

Then at a later stage I think he needs to get an appreciation of all the tools of management—work-study, market research etc. But only an appreciation. It may be, of course, that his job involves specializing in one or a group of these subjects. But he ought at least to appreciate them all. Then there is a final stage, perhaps when he is about 30 to 35, when he needs to study general management as well as his own specialized management, by way of case studies—the distilled experience of other people. His training should be a kind of sandwich—layer after layer.

MR. SIBBALD: I agree. I don't think you can cram everything in at once. That produces mental indigestion. But I feel that there is a definite need today for a new curriculum, an entirely new training programme developed for aspirants to management. Today there are bits and pieces all over the place and lots of individual ideas. But we are becoming more and more specialists and the processes of industry and commerce are becoming more and more complex, and also more decentralized. The old ideas of a training syllabus no longer fit.

MR. WHITE: Surely we are concerned with the man who is already between 35 and 40, has spent 10 to 15 years in the company, and is perhaps a departmental manager. You are not sure whether he will make the grade for top management, but you do want a live personality, who is potentially a capable top manager. How are you going to develop him?

I agree entirely with Mr. Sibbald that there is no really suitable course at the moment. But I have heard of an idea or method which appealed to me greatly, though I have no first-hand experience of it. This was to take a man away from his normal work for six months and say "All right, go up to Bradford and thoroughly investigate the textile industry there—not necessarily relative to our product, but bear that in mind. I want a report of 10,000 or 20,000 words".

The person who was telling me about this said that it worked like a miracle. The man had been in the firm about 15 years. Going to a different industry, new techniques and methods became apparent to him. He was now presented with new problems and ideas. How was he going to take account of them in his report? How could he pursue his enquiries?

The need, as I said, for these men of 35 to 45 is to stimulate them. They probably have a very good grasp of

Job Rotation v Specialization

"Most young men get their broadening experience in small firms. They can do it if they know where they are going and can themselves choose the points of rotation."

"Rotation helps a man to get acclimatized to industry. But he must go from success to success—not move arbitrarily from job to job."

"The sooner a man gets something to do which gives him a chance to make decisions—and to get the feel of responsibility—the better for his development. Rotating doesn't give him that. A specialized career can."

"What is needed is a deliberate loading up of the man with responsibility, so that his main experience comes not in his technical work but in the actual work of managing."

"The present tendency of the large firm is to have so-called management training schemes which do for management trainees what the Welfare State tends to do for all of us—leave the responsibility to someone else."

general management. But their minds are stodgy.

MR. SPENCER: I'm going to question what Mr. White has said because every year I see perhaps 150 of these men, aged 30 to 40, and I would not say that they have a good grasp of general management. But it is no fault of theirs. It is due to our failure to attack this problem earlier that their knowledge is generally much more limited than has been suggested. To a great extent this is also true of the manager who is already taking near-top responsibility. We are having to patch up and make good past deficiencies, in their case. But with the younger people the basic problem is now being partly solved.

The Urwick report was, I think, an excellent document, and the technical colleges have done what they can within their limited means to try to put it into effect. But inevitably many management training courses tend to concentrate only on the background subjects in the Urwick classification. This, I feel, highlights the shortage of teachers of practical management.

We are short of practical managers in the technical colleges. If they can't be got 'free of cost', then we have got to increase salaries to get them there. And that's where this country is lamentably behind America. We do not have people from business coming in to the business schools and technical colleges to teach the codified experience of management.

MR. WHITE: I am not quite sure where the questioning comes in, for I entirely agree with what Mr. Spencer has said (loud laughter).

MR. LANDMANN: From what I have seen of the results of successful executive training schemes, I believe that an important factor is frequent appraisal by the company of each man. Likewise each individual should say to himself: 'How far have I got? Where am I weak? Where am I strong? What facilities exist which I can use to strengthen me on the points where I am weak?'

That may mean taking up new specialist studies or it may mean an appreciation course. But the important thing is to take stock.

MR. MCLEAN: The basis of a manager's training surely must be the gaining of experience by managing. And the part that formal education plays is merely to speed up that process of gaining experience. So it is quite impossible to say in advance what sort of course the mature man should attend. It depends entirely on the particular man, his stage of development, the jobs he is going to supervise, the jobs he is going to do himself.

MR. KEEGAN: Let us not forget that the accumulated knowledge of centuries is at present in our free libraries. They make it possible for anyone to learn of other men's ideas, but the effort is up to the individual.

Managers should, however, guide individuals to some extent, particularly those who have graduated from the shop floor rather than from the universities. It is all too easy for a man to come up through a technical department or a specialist branch and have no idea at all of the literature available on the art of government—starting, if you like, with Plato's 'Republic'.



W. R. SPENCER

"The individual must provide what is most essential—a balanced personality."

LORD PIERCY: Before we pass to the next question, I would like to throw one idea into the discussion. It arises from Mr. Spencer's remark about the shortage of teachers who can teach practical management. In some departments of life one of the best ways of learning is teaching or trying to teach. Coming down to ways and means, supposing it were possible for businesses to give a man six months' leave. I would like to ask whether this time might be most profitably used, in some cases, by doing a bit of teaching as well as doing a bit of extra learning. Is there anything in that?

MR. SPENCER: There certainly is, Mr. Chairman. In my own company's training centre we make it a rule to second consultants for a period of two or three years to the job of training our new men coming in, our clients and others. The first thing they say after about three or four months' teaching is: 'By Jove, this makes you get your knowledge straight'.

I would like to see more industrial concerns using a period of attachment to a consultant firm as part of their own executive development programme. Consultant firms need these men, and I think it is one of the finest ways of developing them.

LORD PIERCY: The fourth question really concerns ways and means, especially *what firms should do to help the development of executives*. What should the aim of the firm be? Is it general philanthropy? Is it developing the firm through their own men? And what should be the scope of their method?

MR. MCLEAN: We are a small firm and we have had some experience of deliberately trying to train men. We found ourselves falling between two stools. We sent two or three men to Urwick, Orr's course at Slough, and that is now looked upon as favouritism. Everyone else—the rest of the executives— are now waiting to be sent. We also sent quite a lot of foremen to the two weeks' course at Burton Manor, and because everyone went, no one was interested in going. And we don't quite know where to go from there.

I come back to the point I have been plugging for the last hour—that firms have to expose men to the sort of forces and situations which will mould their personalities for bigger responsibilities. This means you have to start thinking right from the top down. You have got to start believing in and actually practising the

delegation of responsibility and authority, which is more honoured in the word than the deed. A firm's biggest responsibility is to provide the climate under which men can realize their natural ambitions. The firm should also provide training courses as required, but I think they should in addition look to the man to do something for himself, as evidence of good faith.

MR. SIBBALD: My company had to face this about ten years ago when we started to build up on the sales side, without any staff at all. We had to look ahead and see that in about ten years' time we would want about 20 first-class sales executives. So we recruited young men of about 25 and we saw that among them there was a good 10 per cent who seemed to have the potential for executive development. We watched those men very closely, fed them with the right kind of literature, and devised a training programme which was, I should say, 90 per cent successful.

MR. MCLEAN: Can I add a kind of warning? When selecting people for top management, it is my opinion that you should create the right climate of opinion inside the whole of the organization. You should not have these crown princes that are known to be rising to the top, otherwise you kill the incentive of all the middle and lower managers. I think you need a state of affairs where people are fighting for promotion, fighting for the chance to be trained, and trying to train themselves.

MR. SIBBALD: I certainly did not mean that we chose crown princes. We merely looked to see that we had chosen some men of executive potential. Generally speaking you can tell whether you are going to get an oaktree from an acorn by the shape of the acorn. I didn't say that all the chosen were successful. And the men didn't know that they were selected for anything at all. They were just plain salesmen and they had to fight hard.

MR. LANDMANN: There cannot be any doubt that it is one of the most important duties of top management to ensure that the need for future executives is met in one way or another. If they find that a training programme is the most effective way of meeting that need, then surely it is their responsibility to run it, and to run it as well as possible. On the other hand, the individual surely has a responsibility to the community and to himself to develop his abilities as much as possible. If an individual does not contribute actively to the development needed in a top manager, then he simply lacks one of the fundamental characteristics that are necessary for a top manager.



F. LANDMANN
"Arts, science or technology? It doesn't matter two hoots."

LORD PIERCY: There is, of course, a problem inherent in this fourth point —whether it really is profitable for concerns to provide funds, and what is more important, the time of useful executives, in order to create a system of further training.

MR. KEEGAN: I would say it is good business to train people. One usually imagines in one's firm that things are pretty static, that staff usually remain a long time. I know that is the case with my own firm. But it is surprising how many opportunities occur for people of all ages. Starting with a fairly philanthropic scheme we have found how useful it has been in making the right man available at the right time. Obviously there should be no strings, because if one cannot place a man when he is ready for placing, then the best one can do is to advise him to go elsewhere. He should understand that from the beginning. But very few of the good ones do move. It is usually the good ones who are placed. The problem, surprisingly

Learning v Appreciation

"One way to develop a manager is to take him away from his normal work for six months and get him to study methods and techniques in a field which is unfamiliar to him."

"Training should be a kind of sandwich—layer upon layer. First the young man should study background subjects; then the organization of the individual business. Later he needs an appreciation of all management tools. Finally he should study general management by way of case-studies—the distilled experience of other people."

"It is all too easy for a man to come up through a specialist department and have no idea at all of the literature available on the art of government—starting with Plato's 'Republic'.

"Teaching makes a man get things straight. I would like to see more industrial concerns using a period of attachment to a consultancy firm as part of their executive development programmes."

"The important thing is to take stock frequently. The manager should ask himself: 'Where am I weak? What facilities exist which I can use to strengthen me on the points where I am weak?' "



J. G. MCLEAN
"The man who seeks out more responsibility naturally comes to the top."

enough, is to find enough able men for the places which arise.

LORD PIERCY: Yes, I think that's right on the point.

MR. MCLEAN: We found, funnily enough, when we took an irreplacable man away for a period, that that was the best way to discover the potential of the men underneath him. We have produced some first-class men by just doing that.

MR. SPENCER: If I could join up what Mr. Landmann and Mr. McLean said, training is first of all a joint responsibility. The firm should provide certain facilities, the individual should want to be trained. Secondly, the individual must provide what is most essential in a manager— a balanced personality. That means he must pay attention to the things that should occupy his mind when he is not at work. And these should be not only work. He should develop the cultural side of his existence. No amount of management training can adequately cater for this.

MR. LANDMANN: One of the most valuable by-products, which often pays for the cost of the most elaborate executive development scheme, is, of course, the development of your existing top management. That is one of the things which happen in a well-run scheme. It happens because the existing management team has to be integrated closely, to play an important part in the executive development scheme.

MR. KEEGAN: I think that that is very true, and it doesn't just apply to managers and junior managers. It applies throughout the whole organization. The workmen, and in fact all people like to belong to a progressive organization, and they like to boast about it. Where there is a feeling of progress in an organization, people do tend to develop good relationships.

MR. WHITE: I will second what Mr. Keegan says. I think the most important thing is the creation of this climate of progressiveness. A practical difficulty, I think, very often is to time the finish of the training to coincide with the opening up of a promotion opportunity for the trained man.

MR. MCLEAN: I think we would make a mistake if we considered training as something which ever finishes. It is surely progressive all the time. As the man matures, more and more important becomes that part of his training which is inherent in just doing his day-to-day job— the acceptance of responsibility each day.

For a senior executive formal education is a secondary part of his training. The main programme should be concerned with the deliberate piling on to each man of as much responsibility as he can accept. The man who seeks out more responsibility naturally comes to the top. These people select themselves for further training. But there are others who need some help to get there.

LORD PIERCY: Looking over the discussion as a whole, in some ways the best was the last section, where you did get down to ways and means, to practical results, profit and loss, and so on. That's not to be wondered at.

But overall I did gain one other impression, that we were perhaps leaving out of sight, now and then, some of the finer elements of management. After all, it's the human problems of management which are the most elusive and the most difficult, where the approximation to success on the whole is the most imperfect— although I wouldn't at all under-rate the great achievements in the development of management techniques and skills in our time. *END*

You have read the report. Now the Editor needs YOUR views. Please see the card facing Page **80**.

Whose Responsibility

"You should not have crown princes who are known to be rising to the top, otherwise you kill the incentive of all middle and junior managers. You need a state of affairs where people are fighting for the chance to be trained, and are trying to train themselves."

"It is good business to train managers. Starting with a fairly philanthropic scheme, we have found how useful it has been in making the right man available at the right time."

"One of the most valuable by-products of a well-run executive development scheme is the development of the existing top management team. This happens because they have to be integrated to play a part in the scheme."

"The individual should develop the cultural side of his existence. No amount of management training can adequately cater for that."

"We have found that taking an 'irreplaceable' man away for a period of training has been the best way of developing the men underneath him."

Changes in Partners' Tax Liability

UNTIL May of this year the charges payable by a partnership (by which, for income tax purposes, is meant annual interest, annuities and other annual payments) have been regarded by the Board of Inland Revenue as affecting the tax liability of the partnership as an entity, distinct from the private income of the partners.

Now, however, the Board "have been advised in cases which have recently been before them that this is incorrect, and have decided to raise no objection in future to an individual partner's share of partnership charges being regarded as franked for income tax purposes by his private investment income."

The importance of this change of practice lies in the fact that most 'charges' are paid under deduction of tax, the payer acting as a collector of tax for the Inland Revenue Department. Where there is partnership income already taxed at the standard rate of income tax equal to or greater than the amount of the 'charges,' no further tax will be payable, because (as the name implies) the payments are a charge on the income—*i.e.* something which reduces the income and consequently the amount of tax payable. Bank overdraft interest which is normally payable in full without deduction of tax will reduce the tax payable directly; the examples in Figure 1 show that the amount remaining to a person in cash is the same whether tax is deducted from interest or not.

Where, however, as sometimes happens, the partnership has had a bad year and its income is not sufficient to pay the amount of the 'charges,' or if it has no income at all, this means that the firm, by deducting income tax from charges, will have collected tax which it has to pay over to the Inland Revenue because it has not paid sufficient, or any, income tax to cover this amount. Consequently, the firm would be assessed to income tax so as to charge it with the amount of the tax which it had deducted from the interest paid and which had not already been charged on its other income.

A simple example illustrates this. A, B and C is a firm consisting of three partners. A is entitled to a half share of the profits; B and C are each entitled to a quarter-share of the profits. For the year 1956-57 the firm's profits are nil and the charges paid are £100, from which income tax of £42 10s. has been deducted. The firm has no other income. The firm therefore owes £42 10s. to the Inland Revenue.

An assessment is therefore made under Section 170 of the Income Tax Act 1952 as follows: Interest paid £100 at 8s. 6d.; tax £42 10s.

Until the recent decision of the Board of Inland Revenue, this assessment was raised whether or not the individual partners had private income chargeable at the standard rate, the reason being that the profits of a partnership are, for income tax purposes, assessed and charged in one sum, any income of the individual partners being assessed and charged separately.

Under the revised practice of the Board of Inland Revenue, the firm's position would be as shown in Figure 2, if we assume that A has private income of £75 chargeable at 8s. 6d.; B has private income of £20 chargeable at 8s. 6d.; and C has no private income.

Therefore, instead of paying tax on £100, the firm would be liable to pay tax on £30 only.

FIGURE 1

Example 1. Interest paid in full.

Taxable Income	£600	
Less Bank Interest	100	
Net taxable income	500	
Less tax payable at 8s. 6d.	212	10s.
Net amount left	£287	10s.

Example 2. Interest paid under deduction of tax.

Taxable Income		£600	
Less (*a*) Gross Interest	£100		
Less tax deducted	42	10s.	
Net amount payable to recipient	57	10s.	
(*b*) Tax on £600 at 8s. 6d.	255	0s.	£312 10s.
Net amount left			£287 10s.

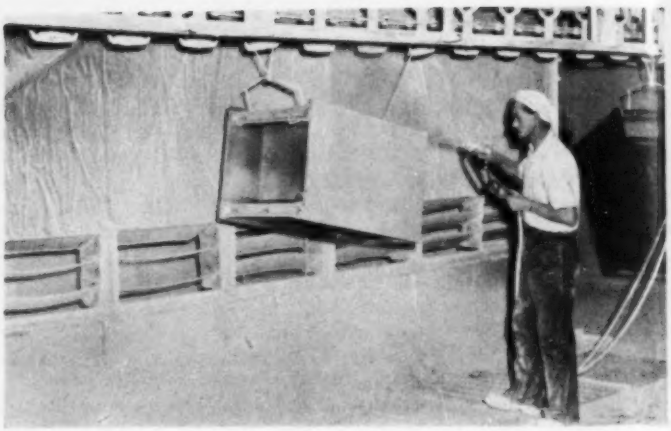
FIGURE 2

Charges paid

	Shares of partners A($\frac{1}{2}$)	B($\frac{1}{4}$)	C($\frac{1}{4}$)	*Total*	
Less private income chargeable at 8s. 6d.	£50	£25	£25	100	
	£50	£20	Nil	70	
	Nil	5	25	30	Assessment to be raised on partnership in respect of interest paid



1 Surface blemishes are more obvious with electrostatic spraying because the thickness of the paint layer is uniform. Marks caused by spot welds and other fabrication processes would show through the paint layer, so have to be carefully removed beforehand.



2 Cabinets are hung on an overhead conveyer, where they remain until final inspection. This carries them through a thorough phosphating process to remove dirt and grease and provide a keying surface. The primer is still applied by hand—a bottleneck in the system—but Electrolux will shortly install the electrostatic process here as well.

ELECTROSTATIC SPRAYING

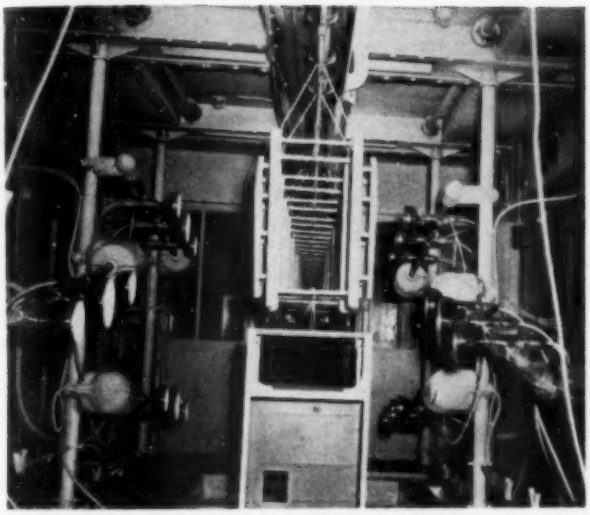
▶ Saves Paint

▶ Improves Finish

Electrolux Ltd. installed one of the first electrostatic paint spraying systems in this country at their Luton refrigerator works 2½ years ago. Their experience since then confirms the chief advantages claimed for this relatively new process: a vast saving in paint—between 40 and 80 per cent—and even distribution over the entire surface of components, the seams and recesses getting the same coverage as panels. The installation required repeated experiments before it was 'just right', but the trouble and expense have been justified by results.



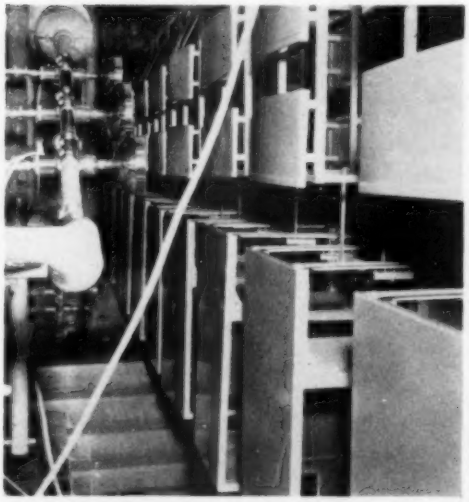
3 All large surfaces go through the new process, but some smaller parts still receive the second and finishing coats (as well as the primer) by hand. This is because their shapes are awkward or because the careful adjustment of the spraying heads, necessary for dealing with a new run, would not be worthwhile.



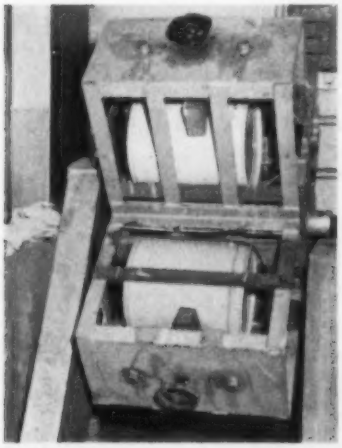
4 Voltages up to 100,000 are used in the electrostatic system so the booth is locked while spraying is done. It is also important to exclude dust which would become electrostatically charged and mix with the sprayed paint. The racks on the conveyer carry small accessories, while cabinets are hung below.



5 There are 19 of these spraying heads, charged at a very high voltage. The workpieces are earthed through the conveyer. The heads revolve at 900 r.p.m. and paint is fed to them through the centre holes. The particles of paint acquire the same charge as the heads. Just as similar magnetic poles repel each other, so the particles separate, causing complete atomization.



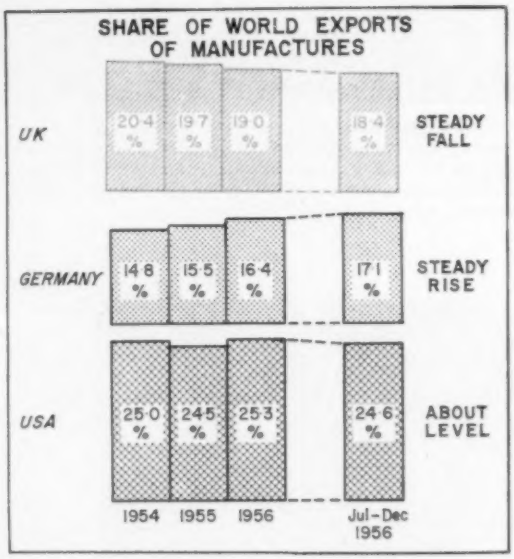
6 Centrifugal force would normally throw the paint from the heads at 180 degrees. But because of their electrostatic charge, the particles seek the nearest source of opposite potential—the workpieces —and strike them in wide arcs. The spray is so fine that it is almost invisible: the work seems to change colour by magic.



7 The paint itself was one of the biggest troubles during the changeover. The type used for hand spraying was found to be unsuitable. Viscosity, temperature, and particle dispersal are much more critical than with ordinary methods, but after much trial and error a suitable paint was found. Prior to use, drums are continuously revolved in a temperature-controlled room to prevent settling.

Your Changing Export Markets

By G. R. LAMPTON.



In recent years Britain's share of world exports of manufactures has fallen

IT is not easy for every Briton to face up to the changing conditions of world trade. Here are three basic facts:

1—The United Kingdom no longer is the world's biggest trader—in fact, our share of the world's markets for manufactured goods is falling fast.

2—The Commonwealth, though still very important to us, is taking a steadily declining proportion of our exports.

3—Over the next 10 to 20 years, Europe is likely to be the world's fastest-growing export marketing area.

World Trade. Last year world exports of manufactured goods rose by about 14 per cent over 1955, but Britain's went up less than 10 per cent. Germany increased hers by over 20 per cent, and Japan's went up by over 25 per cent. But 1956 was no freak year. Over the last three years, Britain's share of world exports of manufactures has fallen from 20.4 per cent to 18.4 per cent in the second half of 1956. Over the same period Germany's share increased from 14.8 per cent to 17.1 per cent.

All this would not be so important if we did not depend on exports to pay for the imports needed to have a high standard of living. Nearly 40 per cent of our food has to be imported, 30 per cent of our raw materials, 10 per cent of our fuels and even about 25 per cent of the manufactured goods we need.

Last year's import bill was nearly

In the years ahead, Europe may become Britain's biggest export market, followed by the United States, and then the British Commonwealth countries. This would reverse the present position, with the Commonwealth first, followed by Europe and then the United States. Exporters will need to watch the Common Market plans and be prepared to take full advantage of expanding opportunities in Europe.

£4,000 million, and exports are so important that expecting cannot be thing Britain expects is manufac- people on a high standard of living,

REPLY-PAID CARD

Survey of Management Training Needs

If you are over 30, you will have been particularly interested in the discussion (page 69) on the training needs of experienced executives who are preparing for top management responsibilities.

What training do YOU think the man over 30 needs most? The Editor of BUSINESS requests you to help him find out.

Please tick any of the following which you think particularly suitable, or fill in an idea of your own. You need not sign the card or name your firm if you so wish.

TEAR HERE

- ☐ *A reading course designed to give you an appreciation of each management function outside your own particular field.*
- ☐ *Regular group discussions with your colleagues, using case studies provided from outside.*
- ☐ *Six months' paid leave to teach management in a university or technical college (as suggested in the discussion).*
- ☐ *Six months' paid leave to investigate a specific topic (as suggested in the discussion).*
- ☐ *A short residential course (say two or three weeks).*
- ☐ *A longer residential course (say three months).*
- ☐ *A course of guided reading interspersed with periods of a few days' discussion at a training centre.*
- ☐ *Any other ideas (please state)* _____

Signature (not essential) _____

Name of firm (not essential) _____

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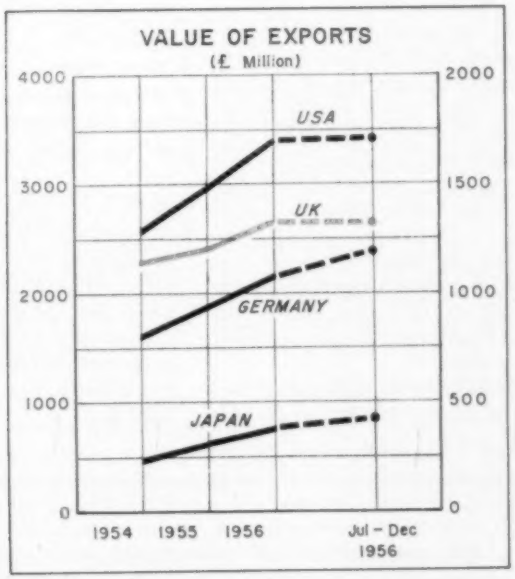
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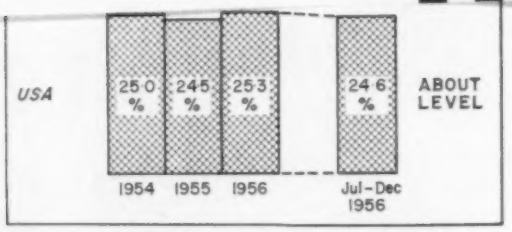
London, S.E.1.

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£4,000 million, and exports are so important that exporting cannot be left only to the big manufacturers. There are less than 3,000 firms employing more than 500 people.

The Government can do a great deal to make it easier for manufacturers to export. And a lot has already been done. The burden of taxation has been and will probably continue to be lightened—since the war a steadily declining share of the national product has gone to the Exchequer. Restrictions on the use of materials have disappeared and the credit squeeze undoubtedly promotes exports. The Government also helps more directly through the Export Credits Guarantee Department, through the Board of Trade and through the sort of negotiations on which it is now engaged concerning the proposed European Free Trade Area.

Whilst it is not difficult to suggest ways in which the Government could do more, the main responsibility for increasing exports must lie with individual firms and their directors and managers.

The World Market. Nearly everything Britain exports is manufactured. Here are the basic facts of the world market for manufactures:

1—Trade in consumer goods is getting less and less important.

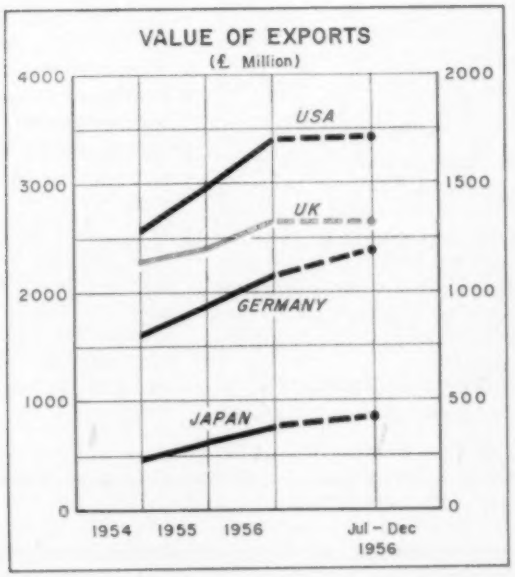
2—The more highly developed countries provide the biggest opportunities for selling both consumer and capital goods.

Limited Progress

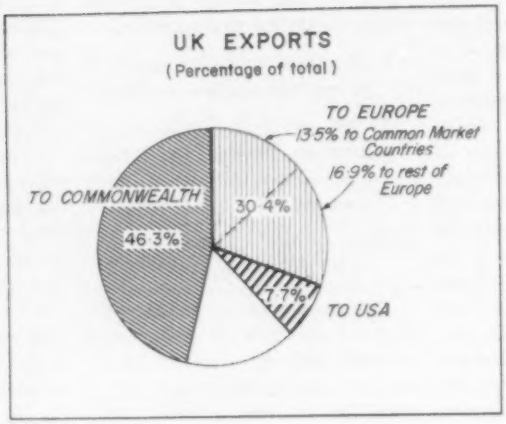
Underdeveloped countries with very low standards of living cannot increase their demands for British exports very rapidly, even though what they are buying from us may be very substantial in total amount. Moreover, in order to develop and participate in more trade, such countries have to industrialize. It is easier for them to make pots and pans or textiles than, say, machine tools or scientific instruments. So it is not surprising that they start by making some consumer goods themselves. On the other hand, countries which have reached a stage of development where there are large numbers of people on a high standard of living, do increase their imports of consumer goods at a great rate. For examples, look at the United States, Canada and Germany, each of which is buying more and more of some British consumer goods.

If we look back at the period since the war, there is no doubt that the big expansion in markets for the things that we are good at making, has been in the more highly developed countries. With a few exceptions, Commonwealth countries are not very heavily industrialized. But almost every European country is industrialized—many of them highly so. It is not surprising, therefore, that imports of manufactured goods by European countries have been increasing much faster than those of Commonwealth countries. And that is one reason why Britain has been losing ground in world markets.

What of the Future? Looking say 20 years ahead, it is possible to list the major world marketing areas in the order in which they are most likely to



German and Japanese exports have been rising, while American and British have remained fairly steady



Although Europe now takes less British exports than the Commonwealth, the relative positions may in future be reversed

increase their purchases of manufactured goods:

1—*European Common Market* (i.e. France, Germany, Italy and the Benelux countries).

2—*The rest of Europe*, especially the projected free trade area members: Austria, Scandinavia, Switzerland.

3—*United States*.

4—*British Commonwealth*, with Canada ahead of the rest.

5—*South America*, with Brazil at the top of the list.

6—*The Middle East*.

7—*The Iron Curtain Countries* (including China).

Just how much effort may be needed by individual British firms in changing their sales emphasis to exploit the best opportunities, can be seen if the order of likely growth of the main marketing areas, suggested above, is compared with their order as British markets now:

	Percent of U.K. Exports 1956
Commonwealth	46
Common Market	13
Rest of Europe	17
United States	8

All-out in Europe. The conclusion is inescapable: if we are to remain prosperous, we must seek a bigger share of the European market for manufactured goods. But any extra effort in Europe should not mean slackening elsewhere. It would be wrong merely to switch our export effort from one part of the world to another. An increasing share of world trade can be won only if British manufacturers increase their total export business.

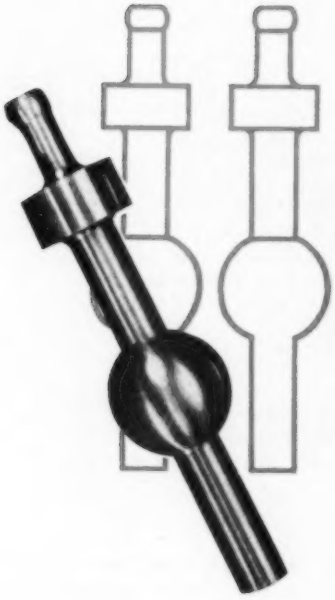
The demand in Europe for our kinds of goods is huge and growing, but that does not make it easy to sell them against resourceful competitors. Selling to Europe is a different matter from selling to the English-speaking parts of the world where hitherto over half of our exports have gone. But nearly £1,000 million worth of British exports last year (over 30 per cent of the total) went to the Continent, and so we are hardly new boys at selling there. We would, however, take a heavy setback if the Government failed to become associated with the European Economic Community (Common Market and Free Trade Area) that is now being developed.

Even if the negotiations are successful, there is another danger. Already German, French and Belgian manufacturers—to mention only the most aggressive—are busy in anticipation of greater freedom to trade among themselves. There is hardly a Continental businessman of any importance who does not know the main provisions of the Common Market treaty and their likely impact on his industry. And many are already taking steps to meet the new conditions. British manufacturers need to make a similar effort.

To sum up:

- We must export more.
- We can do so best by exporting more to Europe.
- To succeed in Europe, Britain must join in the new trading set-up there.
- Many of our manufacturers must begin now to devote more time and money to seeing how they may exploit the fast-growing business opportunities in Europe. An article next month will detail the arrangements for the European Common Market. *END*

Any extra effort in Europe should not mean slackening elsewhere. This is an opportunity to increase total exports



AUTOMATIC COPYING

How It Gives

- *ECONOMICAL SHORT-RUN WORK*
- *FASTER QUANTITY PRODUCTION*

By WILLIAM GUTHRIE

MUCH publicity has been given to the development of machine tools which act automatically on information presented to them in the form of punched cards, punched tape or magnetic tape. To some extent their more sensational features (primarily the ability to 'make parts straight off the drawing-board') have overshadowed equally important developments in tracer-control systems.

Tracer-control means exactly what it says: a stylus follows the contours of a template or three-dimensional master and transmits information to the machine's controls. Thus the shape and dimensions of the 'model' are reproduced automatically in the workpiece.

In some applications, the stylus moves over a stationary template; in others the model (which may be a prototype part) is rotated. But in both cases it is the deflection of the stylus by the contours of the master which is transmitted to leadscrews or other devices controlling the movement of the workpiece in relation to the cutting-tool.

Tracer-control can be applied simultaneously to one, two or three motions of the machine tool. Probably the most straightforward example of one-dimensional work is where a tracing stylus, traversing a flat template, 'directs' the cross-slide motion of a lathe. In two-dimensional work, there is automatic control of two feed motions, usually at right-angles to each other — for example, the saddle and table feeds of a vertical milling machine. Three-dimensional control has more specialized applications.

A big advantage of tracer-controlled machine tools is their flexibility compared with 'automatics' in which a cycle of operations is controlled by relays, limit switches, etc. Because setting-up for different jobs is relatively simple, they can undertake short-run work which might otherwise be uneconomical. Once the 'model' has been made and set up, the machine can turn out replicas at many times the speed (depending on the operation) of manually-controlled lathes, millers or boring mills.

At the same time, tracer-control is capable of speeding up some types of mass-production.

Today, in fact, tracer-controlled lathes and boring and milling machines are found in many types of plant, mass-producing components for vehicle and other manufacturers, handling short-run work for jobbing engineering, and turning out components in very small numbers for experimental purposes.

The first tracer-controlled system appeared in the 'twenties. It took the form of an attachment to a standard lathe and enabled metal components to be reproduced automatically from plaster and wood models. The stylus which followed the contours of the model was linked mechanically to the machine's controls, and because of backlash it was impossible to work consistently to close tolerances. In any case, the development of such systems was retarded by the fact that skilled labour was relatively inexpensive.

Then came the war. Before long, tracer control — in one dimension only—was being applied extensively

to lathes and milling machines. Mechanical linkage was replaced by hydraulic systems which made possible much greater accuracy. But as a rule the tracing equipment was still designed as an attachment to machines which were normally controlled manually.

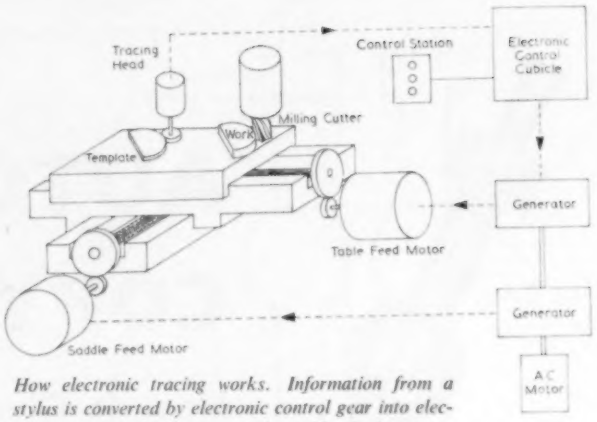
Since the war, the original concept has changed. Progress has been made in four directions:

1—Machine tools are now generally designed specifically for tracer-copying with all controls built-in.

2—The continuous development of hydraulic tracers has offset some of the inherent drawbacks of this form of linkage, and has enabled its advantages to be exploited more fully.

3—The advent of electronic control systems has broadened the scope of tracer-copying by making possible (*a*) higher standards of accuracy, and (*b*) simultaneous automatic control of two or three feed motions.

4—By adding automatic loading and unloading devices, tracers are converted into what are, to all intents and purposes, transfer machines. One operator, not necessarily skilled, can look after a group of them; skill is required only for setting-up.



How electronic tracing works. Information from a stylus is converted by electronic control gear into electric currents which operate the table feed motors.

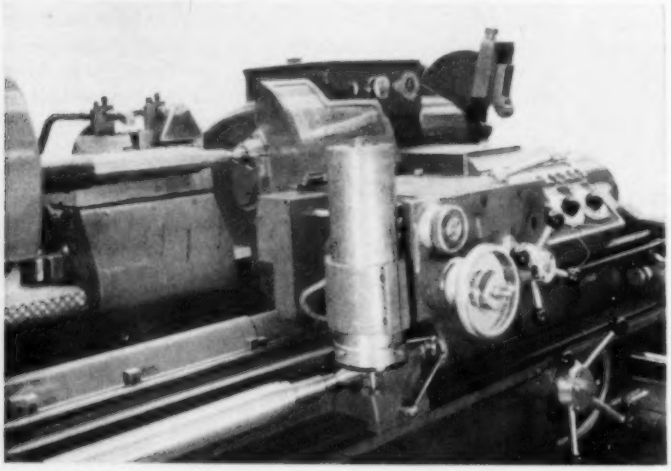
Tracer control gives some of the advantages of the much-publicized numerical control systems — which have barely emerged from the development stage. It is true that they cannot produce parts automatically from drawing office information; the 'master' or template has first to be made on a manually-controlled machine. Against that, however, must be set a number of practical advantages:

▸ For the operator there is the psychological advantage of being able to check tracer deflection and compare it with the progress of the work, to ensure everything is going well.

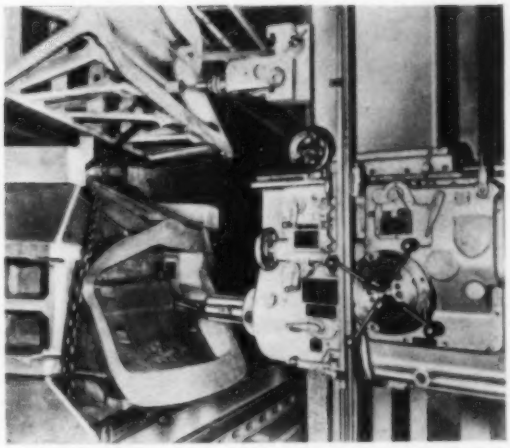
▸ One model serves for both roughing and finishing cuts.

▸ Modifications to models can be carried out in the production shop.

▸ Templates are generally easy to produce and store, and to modify if required. If the product is unsatisfactory, due to backlash or other faults in the performance of the machine, templates may be redesign-



An electronic tracing system is used in the Drummond Bros. 'Maxicut' lathe. At the touch of a button the tracing head starts to follow the contour of the prototype below and reproduces them on the shaft above.



Three-dimensional milling of complicated dies, punches, etc. is relatively easy with B.T.-H. electronic tracer equipment. Information 'read' by the tracer head (below) from the model enables the machine to produce a replica automatically.



ed to compensate for this, just as an experienced worker allows for the 'errors' of a machine which he knows well.

(In punched or magnetic tape systems, despite the use of automatic gauging and complicated 'feedback' circuits, the accuracy with which programme instructions are carried out depends almost wholly on the inherent accuracy of the machine tool.)

A very important consideration is that tracer-controlled equipment is much cheaper than magnetic tape and similar systems. Thus it can carry out work which—on grounds of cost—is outside their scope.

Electronic Control. The main parts of an electronic control system are the tracing head (which incorporates the stylus); the special direct-current electric motors which operate the machine feeds; and the electronic valves and circuits which co-ordinate stylus and motors. The relationship between these components is shown diagramatically on page 84.

The stylus is basically a metal rod, free at the tracing end and held rigidly at the other. Part of it is surrounded by coils carrying high-frequency alternating current. As it moves along the template, it disturbs the magnetic fields. The resultant electric signals and phase shifts are amplified and analysed by the circuits in the control cabinet to the point where they can actuate the motors.

These are special motors designed for accurate movement, fast acceleration, and very fast reversal. Fed by special generators, they enable powers of up to 5h.p. or more to be controlled with ease.

The control cabinet is made up of sub-assemblies of valves and circuits which can be replaced in a few minutes by standard units.

Cutting Rate Adjusted

As already mentioned, electronic tracing systems permit simultaneous control of two or three machine motions. Another advantage is that the cutting rate is automatically adjusted to keep the feed rate constant, relative to the work in any direction.

Part-to-part similarity is generally closer than in the case of hydraulic systems. For example, the tolerance specified on a blueprint may be plus or minus 5 thou. A component 4 thou. 'over' and one 4 thou. 'under' would both be inside the blueprint tolerance, but the part-to-part difference would be 8 thou. For certain products, like engine components, this might be excessive. Discrepancies of this order are possible with hydraulic linkage, due to random and undetected deterioration in the response of the system. But electronic linkage is inherently stable.

An example of the equipment now available is the Drummond Bros. *Maxicut* copying lathe, which incorporates an electronic control system designed by Lancashire Dynamo Electronic Products Ltd.

During the past few years, the British Thomson-Houston Company have co-operated with the American machine tool manufacturers, Giddings and Lewis, in the application of an electronic control system to milling machines. This and the Lancashire Dynamo system are among the most advanced of their kind in the world.

The recently-developed *Velvetrace* copy-milling machine (by Pratt and Whitney) uses a novel form of tracing in which the stylus makes no physical

contact with the master. The gap between stylus and master is bridged by a spark. The slightest variation in the gap produces a proportional change in the voltage across it, and this variation is used to drive the spindle quill and the longitudinal or transverse table motions, giving accurate three-dimensional machining.

Another advantage of applying electronic tracing equipment to copying machines is that it represents about three-quarters of the control equipment required if the machines are to be converted for punched card or magnetic tape programming. This considerably increases the potential versatility of the system and enhances it as a long-term investment. (With hydraulic systems the arrangement for automatic programming would be inelegant, to say the least—necessitating devices to convert hydraulic pressure waves into electrical equivalents, and then to re-convert these into hydraulic values.)

In the workshop, however, there is still considerable prejudice against electronic systems. Often they are regarded as temperamental boxes of tricks, liable to go wrong without warning. Maintenance staffs regard them with suspicion because they are accustomed to dealing with mechanical and hydraulic faults—replacing worn parts, freeing sticking valves, and bleeding air locks.

To combat such prejudices, manufacturers are making their electronic systems as easy to maintain as possible. Meters are built into the main circuits, and charts of specified readings are supplied so that faults can be quickly analysed. Plug-in replacements for sub-assemblies reduce 'down-time.' Moreover, maximum reliability is built into the equipment in the first place; valves and other components are considerably underrun.

Hydraulic Control. The development of electronic copying machines does not mean that hydraulically-controlled tracing systems are out-of-date. On many classes of work, their performance is just as efficient. And as a rule they are much cheaper.

Some hydraulically-controlled machine tools perform very complex operations. They can cut eccentric and spherical shapes on shafts with great accuracy and also with acceptable speed. Their performance is a tribute to the designer—who 'builds in' corrections and improvements to compensate for the shortcomings of the hydraulic system.

The main shortcomings are: (1) that the viscosity of oil—the medium employed — changes according to temperature, and is thus liable to affect the accuracy of the system; (2) that the inertia of the system delays the transmission of information from the stylus to the machine's controls; and (3) that air locks and leakages are liable to cause machining errors before they are detected.

Refinements

Designers have made great efforts to overcome these difficulties. The oil is sometimes held automatically at a constant temperature; steps are taken to prevent motor heat from reaching it; hot swarf is broken up and automatically removed. These and other precautions reduce the effect of hydraulic weaknesses, but cannot eliminate them.

The usual run of lathe work calls for a low cross-slide feed rate, but there are applications which require sharp and frequent changes in direction. From a suitably-compensated template, a hydraulic tracer will produce square shoulders on shafts, but due to the angle at which the tool is held and the inertia of the system, it cannot easily make re-entrant cuts in a shoulder or spherical shape. These difficult operations, which often require automatic control of more than one motion at right-angles to each other, can more conveniently be achieved by electronic tracing systems.

Among the best examples of machines using hydraulic tracing are the Swiss-made George Fischer copying lathes. One special-purpose machine made by this firm forms the concave and convex aerofoils of a turbine blade in a continuous operation. At the same time, it machines the passages between root and aerofoil. Before the introduction of this machine, the concave and convex aerofoils required separate operations, while for the other processes special fixtures had to be clamped in at several stages. Now the one continuous operation avoids having to overlap several cuts, a practice which can seldom produce 'perfect' results.

A combination of electronically and hydraulically controlled machines is used by one manufacturer to produce blades. Templates made on a tape-controlled E.M.I. miller are supplied to hydraulic copying machines.

Another special Fischer machine (equipped to perform several operations in a prescribed sequence and to go on repeating them indefinitely) mass-produces races for roller- and ball-bearings.

Hydraulic copying lathes marketed by H.E.B. Machine Tools Ltd., London, are used extensively by the motor industry for copy-turning components like crown wheels (55 seconds), steering gear ball pegs (40 seconds) and stub axles (two minutes). All these times show considerable savings over manual methods. The machines, of French design, are shortly to be made in Britain by Drummond Bros. Ltd. *END*

Electronic tracing equipment is a long-term investment—it represents about three-quarters of the control equipment needed for subsequent conversion to punched card or magnetic tape programming



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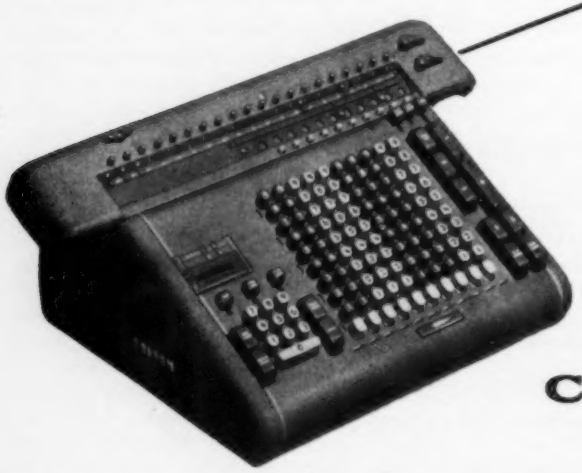
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Electronic Computer Will Reduce Their Stock Balance

TO cope with their rapidly expanding business, Littlewoods Mail Order Stores, Crosby, near Liverpool, are soon to install a National-Elliott 405 data-processing system. Provisionally it will be employed on problems of stock control.

The complete installation, consisting of 19 cabinets, plus console and ancillary equipment, will cost about £80,000. It will occupy about 5,000 sq. ft. of floor space, including office accommodation for a team of approximately 30 programmers, methods men, and preparation and printing staff.

Littlewoods foresee that the main advantage of running a stock control system on a computer is not that it will save staff, but that it will enable them to operate on a reduced stock balance—that is, to get the right stock in the right place at the right time.

Throughout the preliminary investigations carried out jointly by Littlewoods and the computer manufacturers, it has been considered that the function of the computer organization should be 'advisory' and not executive. Broadly speaking, this means the computer will report on items which deviate from set standards, allowing management to decide the course of action to be taken.

Machine Tool Control

UNDER a licensing agreement concluded recently with Farrand Controls Inc. of New York, The Plessey Company Ltd. are to develop applications in Britain for the Farrand system of electronic machine tool control.

Basis of the Farrand system is a position control element known as a Linear Inductosyn. Consisting of a scale and slider, this allows positional accuracy of better than .C001in., with a repeatability of approximately 25 micro-inches.

Electronic Show-piece

THE IBM computing centre—situated on the ground floor of the new premises in Wigmore Street, London W.1.—is not the first of its kind in Britain but it is certainly the most eye-catching. Through plate-glass windows passers-by can watch the operation of a large range of electronic and other data-processing equipment. The decor of the 112ft. by 41ft. computing area is bright and imaginative.

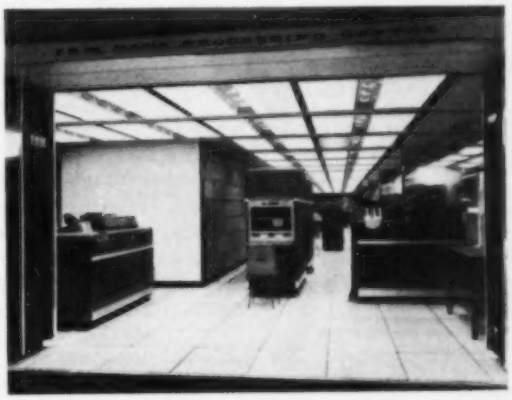
Centrepiece of the new service is a 650 magnetic drum data-processing machine. This is supported by a battery of punched card accounting machines, calculators and auxiliary equipment—a unique feature among British computing centres. Soon the 650 is to be augmented by a 700 series computer. The first of these big American-built data-processing machines to reach Britain was delivered recently to the U.K. Atomic Energy Authority (BUSINESS May 1957, page 63).

The 650 computer is already established in the U.S.A. and on the Continent; about 700 of them are actually in operation, and a further 1,300 are on order. A British firm have been using one for scientific and mathematical work since the beginning of 1956, and a second machine, equipped with magnetic tape memory units, is now being delivered to them.

Recently the 650 went into production at IBM's Greenock factory. By the end of the year, five or six machines will have been delivered to British organizations. Most of these are ear-marked for commercial applications.

For the time being at least, the computing centre will be concerned mainly with scientific and mathematical problems. But it is also undertaking some commercial work, including one-shot jobs like market research, and experimental routines for companies who may eventually install their own machines.

Basic charge for computing time is £30 an hour. The cost of renting a 650 computer full-time is in the region of £400 a month.



A 650 data-processing machine is at present the centrepiece of IBM's new centre. But bigger equipment is on the way.

MANAGEMENT AT WORK

C.T.C. Strikes Again

VAUXHALL Motors Ltd. have a Budget Control department consisting of no less than thirty cost accountants. Recently these economy-mongers held an all-out four-week cut-the-cost campaign. One effect was that requisitions for inter-office stationery could be suspended for three months—a saving of several hundred pounds.

The campaign, which cost only £40 for posters and publicity aids, started in much the same way as the case-history reported in the April issue of BUSINESS (page 74). One morning 4,000 notices appeared, showing scissors cutting a £ sign. Distribution of these notices was on all notice-boards and clock stations. They also found their way on to directors' writing pads. At the week-end, every pay packet contained a printed slip explaining the campaign, and a centre-page feature in the house magazine was devoted to it.

In addition to staff efforts, positive action was taken by the professional cost-cutters:

- Staff were asked to scrutinize all scraps of paper, with a view to re-using them for internal purposes by writing or typing on the reverse side. All notices connected with C.T.C.—and all posters—were produced on such material.

- Lighting was checked carefully, and, while health and safety remained safeguarded, it was found that strip lighting could be cut by a third.

- Scrap bins were carefully sifted to produce material that could find other uses or was suitable for return to stores. A shop floor display was then arranged showing some of the pieces thus recovered, and the cash value they represented.

Coal on the Screen

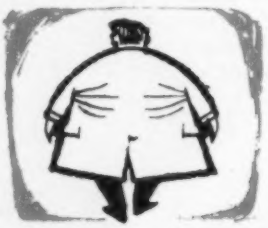
IDEAL application for industrial T.V. is to be found at the Manvers coal preparation plant at Wath-on-Dearne, where the output from four collieries is processed. Coal input is by means of moving belts. At one cross-over point, several belts converge, and any obstruction or breakdown here can have a disastrous effect—tons of coal piling up and spilling within minutes.

Now an industrial 'vidicon' camera has been set up to watch this point. In the plant control room, a 14in. monitor screen allows the duty engineer to keep a watchful eye on belt working and loading conditions. Any fouling or failure of the drive mechanism can be spotted, so that corrective action may be taken before serious damage is done.

'Hello' Booklet

BATCHELORS Peas Ltd., Sheffield, have produced a welcome booklet to put new arrivals in the picture and inform them of company affairs.

As the illustrations show, amusing little thumbnail sketches enliven its pages. It only measures 6in. by 4in.



Subsidized canteen meals

These two drawings help to make new employees feel at home (see: 'Hello' Booklet)

—truly pocket-sized—but it is packed with useful information. Company history, working conditions, health, safety and welfare arrangements, sickness benefit and many other points of interest to the newcomer are covered by it in a friendly style. Up at the front is a 'personal' message from the Chairman: "I hope you will like your job and be both happy and successful", he says.

Psychology note: the booklet is so well produced that there seems to be some danger of employees just skipping through it and looking at the cartoons. So to encourage earnest perusal, employees have been issued with quiz forms, with questions based on the booklet's contents. A prize of £25 is offered for the best set of answers.

Double Your Money

H. J. HEINZ Co. Ltd., London, have made a goodwill gesture which seems likely to go down well. All employees who are eligible for from one to two weeks' holiday this year will be paid double their weekly rate of pay over the holiday period. Furthermore, they will get the money *before* the holiday starts.

The new arrangement replaces a holiday bonus that was paid by this company in August, 1955 and 1956. But the management stress that such payments must be closely linked with results, and that future arrangements will depend more on manufacturing and sales progress than on this year's precedent.

Celebrations

WHEN a firm reaches certain milestones in its history (21st birthday, golden jubilee, etc.) it is usual for feasting and speeches to take place. But here are two celebrations-with-a-difference:

1—Peak Frean and Co. Ltd. reached their centenary in May. They organized a fête at their sports club and mounted an exhibition covering the history of the firm. In addition, they also distributed some £40,000 to



You must apply for benefit



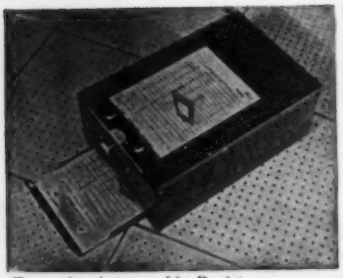
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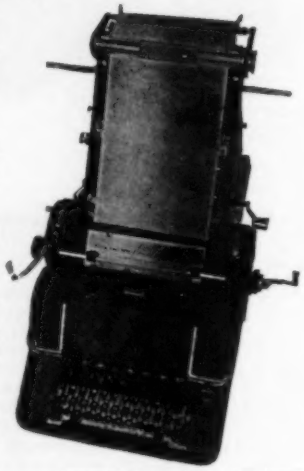
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employees and pensioners—a rather more solid goodwill gesture than is usual.

All workers with not less than eight weeks' service participated in a *pro rata* share-out based on length of service. But the kindest thought, perhaps, was reserved for the company's pensioners, who received £25 each.

2—Smee's Advertising Ltd., a comparative baby of 25 years, decided that a breath of fresh air was just the thing to mark their quarter-century of operations. Employees were taken by coach (albeit on a Saturday morning) to Windsor, where they boarded a chartered boat. This cruised upriver to Maidenhead, where lunch had been arranged at the Riverside Hotel. Afterwards, the party continued with the cruise, returning to Maidenhead for tea, and thence to Windsor and home.

House Journal Honoured

THE International Council of Industrial Editors has awarded one of its top prizes to the Gordon and Gotch Ltd. staff paper 'Echo', in a contest that was judged in the U.S.A. The same paper recently won an award in the British National House Journal Competition.

What is the star quality that singles out this publication? Perhaps it is best summed up as 'thoroughgoing professionalism'. Reading it, one feels convinced that people at Gordon and Gotch are a friendly, happy crowd. Most striking is the absence of parochialism, although every item concerns the firm.

The success formula seems to be based on the following points:

1—**Excellent photographs** (including one that entirely covers the tabloid front page). The Echo photographer always seems to be on hand when something good is happening—however unexpectedly. This argues a keen news sense somewhere in the firm.

2—**Straightforward lay-out.** Nothing fussy is allowed to distract the reader's attention. On the other hand, no concessions are made to 'beautiful' typography. The paper looks businesslike. Headlines catch the eye without gouging it out.

3—**Good copy.** A brutal editorial hand has been at work streamlining contributions and bullying authors. Result: one of the very few house journals that can be read without making any allowances at all.

What Form of Management Training Do You Think the Executive Over 30 Needs?

See card facing page 80.

No Cash Secrets

MOST major firms in this country have now produced careers booklets. In general, the standard of presentation has been high. But there has been what amounts to a conspiracy of silence about salaries.

Now Mullard Ltd. have come out with a handsome publication called 'Opportunities in Electronics'. True, the text still breathes no word of cash. But the back cover has been folded and gummed to form a pocket. Inserted in this is a leaflet with complete starting salary scales for graduates—at whom the publication is aimed.

This sheet is dated, and can easily be changed when necessary. Such a realistic solution could profitably be adopted more widely.

Platform Parity

A SMART piece of labour relations thinking was demonstrated by Celotex Ltd. recently, when they arranged a ceremony to mark the opening of a new £1 million hardboard plant at Stonebridge Park, London. Having decided that there were to be only three speakers on the platform, they invited the convener of shop stewards from the plant to be one of them.

Some 150 workers attended the ceremony. They were delighted to hear their spokesman boldly assert that "the workers are part of the management".

Did this cause consternation on the platform? Not a bit. For the speaker went on to draw the logical conclusion that the workers would therefore do their best to make that management a success. The thinking behind this speech may not have been particularly original. But how much better ideas like this are when put across by a union man than by top brass.

Business Bookshelf

MARKET RESEARCH AND SCIENTIFIC DISTRIBUTION by A. H. Davies and O. W. Palmer (Blandford Press) 42s. The authors are advertising executives regularly handling the application of market research techniques to advertising and marketing problems, but they are also lecturers, one at the College for the Distributive Trades and the other at the City of London College. Hence they are able to fulfil with some considerable success, their claim to have written a book that the lay executive can understand, but which goes thoroughly into such problems as choosing the sample, designing the questionnaire, selecting and training interview staff, branding, packing and display, and the choice of distribution channel.

LORD NORMAN by Sir Henry Clay (Macmillan) 36s. The late author was adviser to the Governor of the Bank of England from 1930 to 1944, and so was well suited to write a biography of the Governor whose name is so much associated with the pre-war period of depression. All the records of the Bank of England as well as the papers of Benjamin Strong, Governor of the Federal Reserve Bank of New York, were made available to him. The result is a book that is even more important as an economic history than as a biography.

One of the deepest impressions left by it, is of the incapacity of men in leading positions, however brilliant, to do much about a major catastrophe like world-wide depression. They were hampered by their own inability

to see, let alone agree on a suitable course of action within the country. And when they also had to have the support of leading men in other countries overseas, at a time when mutual confidence was at a very low ebb, the position became quite hopeless, even though Lord Norman himself did much to build up confidence and the machinery for international agreement.

The boom of the post-war years has been continually sustained by such "temporary" factors as re-armament, resulting from fear of international communism; inflated consumer spending, resulting from repeated trade union wage claims; the insatiable spending appetite of the Welfare State; and rapid technical progress in certain major industries, such as chemicals and electronics. But any or all of these factors might abate. Could we then get a sufficient measure of international agreement to take decisive steps to avoid a recession?

H.R.H. THE DUKE OF EDINBURGH'S STUDY CONFERENCE ON THE HUMAN PROBLEMS OF INDUSTRIAL COMMUNITIES WITHIN THE COMMONWEALTH AND EMPIRE, OXFORD 1956. Vol. 1, report and proceedings; Vol. 2, background papers, appendices and index. (Oxford University Press) 42s. the set. The detailed papers prepared in advance by members who came from all over the Commonwealth, and the main addresses to the conference, make very informative reading. But the study group reports are less conclusive. These study groups were well run, and members learnt a lot on their tours of British industry and in their discussions. But differences of opinion would no doubt tend to make it difficult for them to reach firm conclusions. Nevertheless, the main conference papers and speeches, as collected in these volumes, are a mine of information about industrial conditions all over the Commonwealth.

PUBLIC RELATIONS IDEAS IN ACTION, edited by A. H. Center (McGraw-Hill) 37s. 6d. The author is a former national director of the Public Relations Society of America, and has collected together 50 case-histories of different types of successful public relations campaigns run by American firms, to win support from one or other of the five publics—employees, investors, the management team, consumers of the product or the community in general. In addition to the detailed case-histories there are references to a few hundred other public relations ideas that have been tried successfully.

STARS AND MARKETS by Sir Charles Tennyson (Chatto and Windus) 21s. A very readable autobiography describing, among other things, the author's work in the foundation of the Federation of British Industries, and his period of 15 years with the Dunlop Rubber Company. One of the most remarkable tributes he pays, concerning his period with Dunlop, is to the work of the late Frederic de Paula, who introduced the system of financial control which made it possible for such a large organization to keep a check on the activities of its widely-flung subsidiaries and departments.

MAKING YOUR SALES PRESENTATION SELL MORE by E. J. Hegarty (McGraw-Hill) 37s. Written by a leading American sales consultant, this is another of those eminently readable personal testimonies, concentrating on practical suggestions for improving performance in the presence of the customer—what to say, what to do, and what to ask the customer to do.

HOW TO DOUBLE YOUR INCOME IN SELLING by Alfred Tack (The World's Work) 21s. An easily-read personal testimony by an outstanding salesman and founder of a school of salesmanship and human relations.

MANAGEMENT GUIDE TO OVERSEAS OPERATIONS, edited by D. H. Fenn (McGraw-Hill) 34s. Report of the talks and discussions, held at Harvard in June, 1956, on the problems of American business firms operating overseas. It contains good specific advice on details—sometimes case-histories told in the first person.

THE EMPIRE AND COMMONWEALTH YEAR BOOK 1957-8, edited by Ronald S. Russell, M.P. (Newman Neame) 50s. Gives a comprehensive account of the location, history, consitution, general population and other statistics, trade and communications of over 80 countries in the Commonwealth.

BRADSTREET'S REGISTER 1957-58 edition. This well-known credit control system gives credit and status details of 163,000 businesses in the United Kingdom, covering all manufacturing and distributive trades. The register provides an immediate credit check without the need for correspondence and delay. Entries are under town headings, with a gazeteer in each volume for quick reference to towns. There are five regional volumes, covering the London postal area; the Southern Counties and Wales; Midland Counties; Northern Counties; Scotland and Northern Ireland. Each is available for 15 guineas, or all together for 60 guineas, from Dun and Bradstreet Ltd., Adelaide House, London Bridge, London, E.C.4.

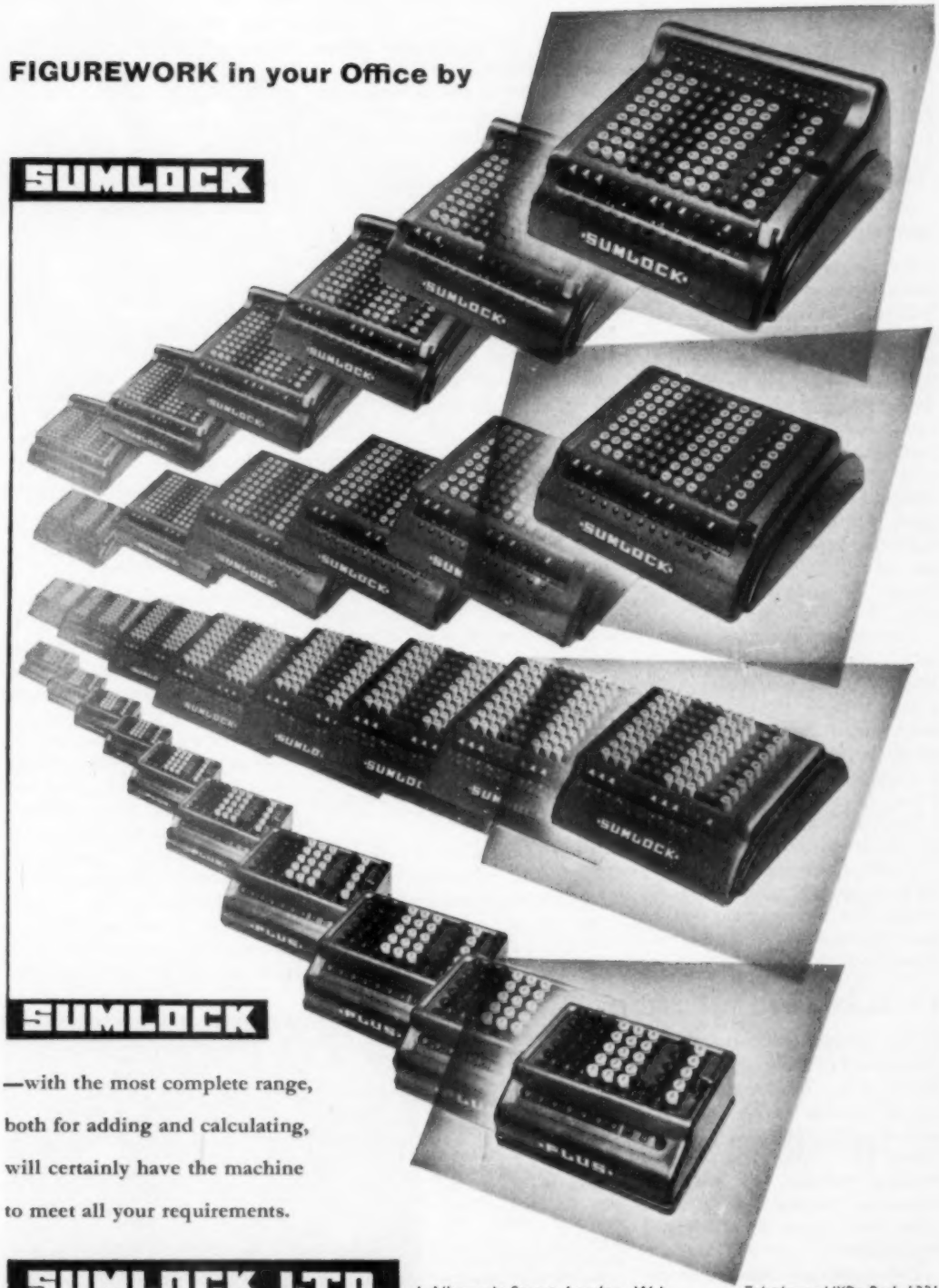
Are Your Costs and Prices Realistic?

Does your thinking take account of changing values? So many things have gone up in price—labour, machinery, supplies, professional services and finished goods. This table, based on the retail price index, gives you a rough set of conversion factors for bringing your values up-to-date. For example, if you spent £100 on a machine in 1931, for which year the conversion factor is 2.77, then you could hardly be surprised if a similar machine now costs £277. It may actually cost more or less, but you would expect values generally to be around 2.8 times the 1931 level. This table will be brought up-to-date every quarter, but published monthly, for handy reference.

Year	Conversion Factor	Year	Conversion Factor
1913	4·07	1934	2·89
1919	1·87	1935	2·83
1920	1·64	1936	2·77
1921	1·81	1937	2·63
1922	2·22	1938	2·60
1923	2·32	1946	1·69
1924	2·32	1947	1·60
1925	2·32	1948	1·49
1926	2·37	1949	1·45
1927	2·43	1950	1·41
1928	2·45	1951	1·26
1929	2·48	1952	1·18
1930	2·58	1953	1·14
1931	2·77	1954	1·12
1932	2·83	1955	1·07
1933	2·89	1956	1·02

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SUMLOCK

—with the most complete range,
both for adding and calculating,
will certainly have the machine
to meet all your requirements.

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SELLING POINTS

Give Us the Tools . . .

● Full marks for enterprise go to James Grant and Co. (East) Ltd., Edinburgh furnishers. Like many another store, Grants have opened a new do-it-yourself department for home decoration, with helpful open-shelf displays of paints, wallpapers, door furniture, small ironmongery, portable power tools, etc.

But they have taken this aspect of retailing one step further. They asked themselves: how can the handyman redecorate if he has not the correct tools? How can he acquire the correct tools and still afford to pay for materials?

Their answer has been to introduce a three-day hire service for home decoration kits. These include a pair of paper scissors, distemper brush, paper brush, folding paste table, one 8ft. plank and two pairs of 6ft. step-ladders—not bad value at 25s.

The store deliver and collect the kit free of charge. Single items are not hired out separately, to simplify the book-keeping. Results from this service have been so good that the possibility of other kits is being considered.

T.V. Case-studies

● Considerable use is being made by Associated TeleVision of advertisers' case-histories. The latest one to be put out concerns Ronuk Ltd.'s new silicone polish, *Spix*.

State ATV: "This polish had been marketed without T.V., with disappointing results. The product made little impact on established rival polishes."

Then a trial six-week period was agreed upon, during which T.V. advertising was to be used exclusively and intensively in the London area. ATV themselves helped the effort by undertaking a mailing of every grocer in the London area, telling them of the campaign.

By the end of the six weeks, not only had an urgent consumer demand been stimulated, but the number of distribution outlets stocking *Spix* had gone up by no less than 500 per cent.

Hot Samples Sell

● Salesmen of the Heinz food firm in the U.S. recently had to launch a new line of tinned baked beans. To get prospects interested they each got hold of several vacuum flask containers, filled them up with freshly cooked beans of the new variety, and had retailers more or less eating out of their hands!

Incidentally, the new Heinz line provides an object lesson in market research. With tinned bean sales running at 150 million dollars a year, the firm might have felt smug and satisfied. Instead, they polled housewives and learned some interesting facts:

1—97 per cent of all American families use some tins of beans every year.

2—But 75 per cent of all sales are concentrated on only 25 per cent of the population.

3—Over 50 per cent of all housewives interviewed habitually add other ingredients when using tinned baked beans.

Result of all this research was the new variety, called *Campside*. It costs appreciably more than plain baked beans, but it has 'extra ingredients' already built in, and is designed to capture a slice of the market which research showed was still untapped.

Write-it-Yourself

● Consumer competitions rarely change (explain in 150 words why you think LUSH is just about the finest, crunchiest, most toothsome toffee-apple you ever tasted).

But the other day London's United Dairies challenged their customers to write the storyboard for a television 'commercial.'

Press advertisements and leaflets at the company's 600 shops publicized the offer of three prizes—£50, £25 and £15. The winner's entry was actually made into a 'spot' commercial, and shown by back-projection at the Ideal Home exhibition.

Tip for Dollar-drivers

● British exporters to North America should study the strategy used by Lever Brothers to introduce their new liquid detergent *Wisk*, and the methodical way they are pushing it into first place in the U.S. soap war.

Wisk started on its way more than a year ago. But only in May did promotion for it begin in the vital New York and West Coast markets. Reason: Lever are planning market-by-market saturation. They take one area at a time, and concentrate a barrage of publicity on it. Presumably the cost of a nationwide introduction at top pressure would be too much, even for that giant combine.



This illuminated display for the new Super Knitmaster home knitting machine was designed by Wilkes Bros. and Greenwood Ltd. Obviously inspired by a TV panel game, it illuminates in turn a number of circular displays which give examples of the machine's speed and economy.

Example: 'Girl's Jumper —Knitted in 29 minutes —Wool cost 7s.'



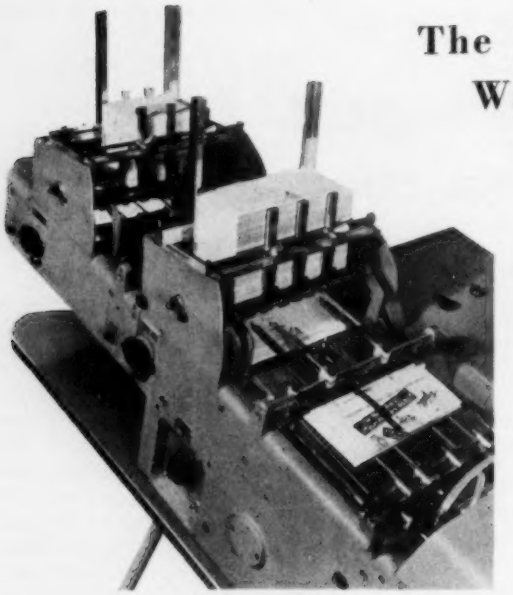
WE DESIGNED CHEVRON angle for maximum utility. We looked at angles with slots, angles with holes, angles with both slots *and* holes; single row, double row, triple row—what is needed, we said, is *one* slot, carefully calculated in shape and size to do every job and repeated everywhere. So we made CHEVRON with right-angled slots, every one the same shape and size, and we put exactly the same pattern on each flange. The result: you will find at least one bolt hole *no matter how the angles overlap*. No special cutting positions, no wasted material, no awkward spaces to allow for. Moreover, the flange has a lattice girder outline with all its inherent strength. Surely this is the simplest, most logical answer.

Since its introduction no other angle has been proved so thoroughly practical.

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Hopper Feeding Mechanism

The New BEM Envelope and Wallet Filling Machine

Will insert and seal into over 3,500 envelopes as many as 6 enclosures of different sizes and thicknesses in one hour. It is so accurate that it is now used to mail cheques, and it is so easy to operate that a junior is able to work it after only one hour's instruction.

It frees at least 16 hand-workers for more productive work, saves valuable space and makes possible more mailings to reach new markets at speeds and costs hitherto believed impossible. Many other hidden advantages outweigh the obvious savings. Valuable lists no longer leave the premises. All printing can be checked. Invoices, Statements, Cheques, Warrants, Notices, Leaflets, Letters, Circulars, Punched Cards, and countless other items can now be speedily mailed.

STANDARD SPECIFICATIONS

Electronic Safety Controls. Electric Micro Paper Gauging Devices with Positive Adjustable Vacuum Feed. Mechanical Insertion. Advanced Stacker Design with Multiple Pressure Rollers prevent misses, double insertions, jams, ensure efficient sealing, stacking and accurate counting. Each hopper is adjustable to take inserts of various sizes and thicknesses and can be switched off when not required. Up to 6 insertions can be added to a single hopper machine after it has been installed. Enclosures such as letters, folders, cards, booklets, should not be thicker than $\frac{1}{16}$in. and not less than $\frac{1}{4}$in. shorter and $\frac{1}{4}$in. narrower than the envelopes, which may be from 5in. x 3in. to 9$\frac{1}{2}$in. x 5$\frac{1}{4}$in. with depth of flap up to 3in. with open or closed windows and appellant tucked-inflaps. Weight of single hopper machine is 200lb. and each extra hopper 40lb. Length 4ft. 6in. Width 2ft. 5in. Length of each extra hopper 13in., width 15in.

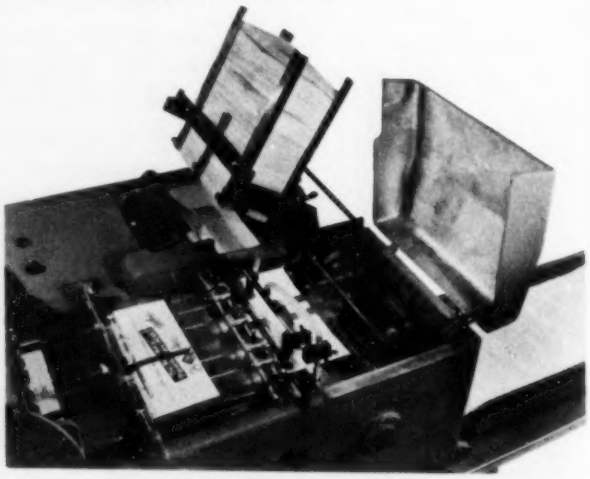
Special Applications

If you have any mailing or packing problems which appear too difficult to mechanize, please bring them to us, for the machine is designed to take special attachments and maybe we can design something to solve your particular problem.

PRICES AND DELIVERIES

Price single hopper machine £1,200. Each extra hopper £200. Delivery 3-4 months.

Increase profits by cutting costs and opening door to new business



Envelope-filling Mechanism

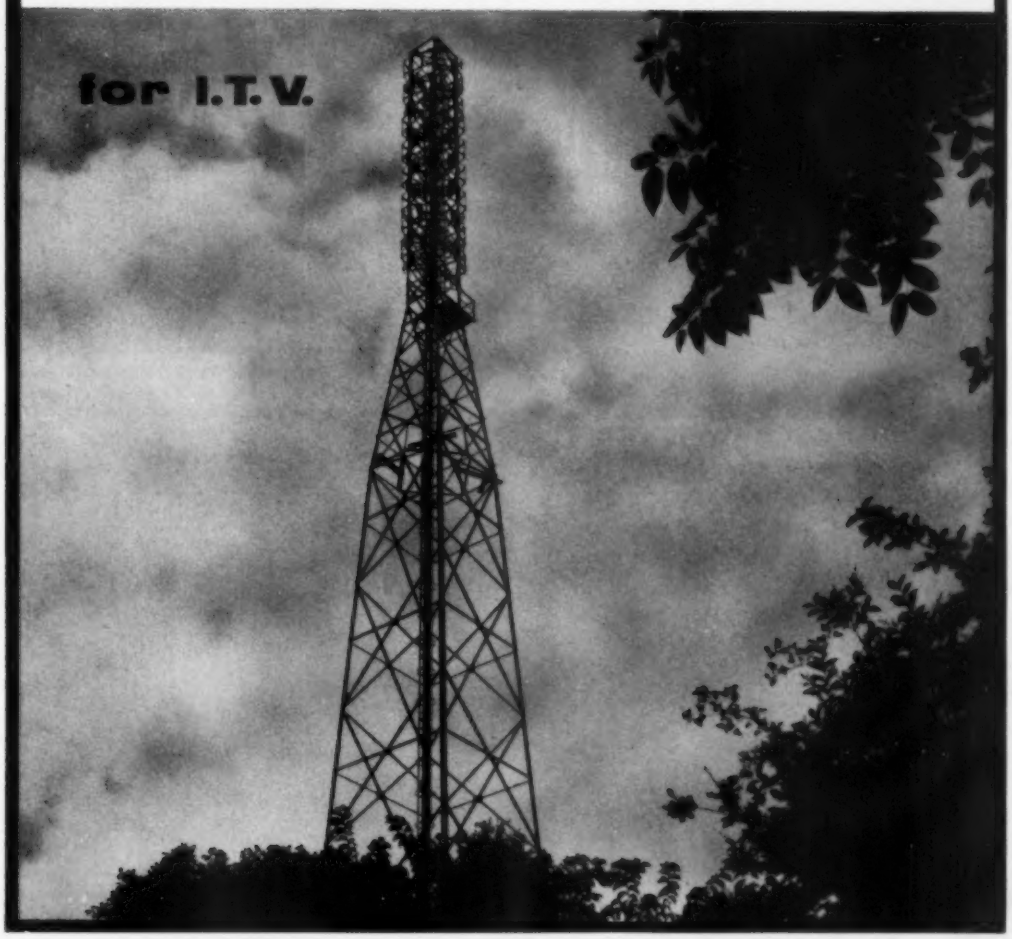
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Business Efficiency Machines Ltd.

(The Adras Addressing Machine and Paper Handling People)

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Catesbys lay Lino



Busy people at TV House are hurrying around on Catesbys Lino all the time. But nobody notices the patter of all those not-so-tiny feet.
Offices are high tension places that need quiet underfoot. It's a matter of good laying as well as quality. Which all goes to show that the bravest new enterprises work on a basis of well proven practices. That's why ITV had Catesbys, with their 60 years experience, to lay lino.

Catesbys contracts LINOLEUM DIVISION

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New Look for Old Premises

By JOHN A. ASH



SEE-ALL SWITCHBOARD ensures that callers are never left hanging on. Telephonist can see at-a-glance who is out or busy

A small paper-converting firm decided, as part of a modernization programme, to bring factory, warehouse and offices under one roof. Their first step was to design a new type of office—resembling in many ways a ship's bridge. Cost has been kept to a minimum, but the overall result is modern, bright and efficient.



QUICKER COMMUNICATION between factory employees and managers. Instead of going into the offices, they speak through glass hatchways

MANY of London's commercial buildings are ageing rapidly, and because of development plans tenants are generally disinclined to undertake any drastic reorganization or redecoration. But the experience of H. R. Dansford and Sons Ltd., paper merchants and converters, shows that big improvements—in appearance as well as efficiency—can be made without spending a lot of money.

Recently this firm completed the first stage in the modernization of their Epworth Street, E.C., premises: the conversion of part of a factory floor into a modern, completely new type of office which they call 'The Bridge'—because it is now truly the nerve centre of their business.

The managing director, M. E. Rubin, bought up the firm just after the war, and under his guidance the annual turnover has increased from £12,000 to £300,000. The firm sells mainly packs of paper for typing and duplicating. Out of a total of 60 employees, 14 are in the office and 10 are outside sales representatives.

The business ticked over fairly smoothly until Mr. Rubin decided to sell his products in brightly coloured packs: then it boomed, and now the firm are expanding rapidly.

Until recently, their Epworth St. premises housed only the offices and warehouses, and the paper was converted in a separate factory. Even though Mr. Rubin had only a 10-year lease on the premises he wanted to make the most of them. In the surrounding area quite a lot of new buildings were going up, but the rents were astronomical. Mr. Rubin



SOUND BARRIER for the accounting machine. Acoustic-tiled partitions allow operator to clatter away without disturbing the rest of the staff



SPACE-SAVING wall fittings leave desks clutter-free. Lateral filing unit helps to break up open office space



WINDOW WALLCHART helps stop glare from the large windows. Net curtaining hides ugly frames and also diffuses harsh sunlight



STACKED SAFES save more floor-space, and provide privacy for the accountant. Heavy red curtaining hides safe from view

discovered that if he took new offices, within 18 months the extra rent bill would exceed the cost of re-organizing the Epworth St. building. So he decided that his already thriving business could be further improved by having the office, factory and warehouse all under one roof. This has meant using every inch of space to the best advantage, and arranging the facilities to allow for further expansion—all at low cost.

In consultation with Alan Best, an interior decorator, Mr. Rubin conceived an entirely new office design. Shaped like the bridge of a ship, it runs down one side of the factory space on the second floor of the building, and is separated from it by a double-glass partition.

One of the reasons why glass has been used between the office and factory space is that Mr. Rubin feels there should be no distinction between office and factory. At the same time the double glass isolates the office staff from the noise of the factory and prevents any reduction of efficiency on that account.

The office is based on the open principle, with all staff working in



FREE-WHEEL FILING allows records to be taken to where they are needed. This saves staff moving about and takes up very little floorspace

one long narrow room—except that Mr. Rubin has a separate office, and there is also a room for committee meetings, for interviews, and for the outside sales staff to use when making up their returns.

The wall at one end of the main office is the firm's showroom. Pegboard type wall panels allow the display of products to be changed regularly. It is necessary to walk through this showroom to enter the main office, which has a few half-partitions extending from one side to give some privacy and cut down noise.

Immediately adjacent to the showroom is the telephonist, who is so positioned that she can see down the entire length of the office. Mr. Rubin feels that this is important, for she can see immediately if any member of the staff is out, engaged, or particularly busy, and thus callers are never left hanging on.

Next comes the section where the orders and invoices are handled. Half way down the office, the London area manager and the sales manager have their desks, and along the opposite wall sit their secretaries.

The managers sit along the partition separating the office from the factory, and beside each of them is a hatchway with a sliding glass panel. When a factory or warehouse employee wishes to speak to one of the managers, he has only to open the hatch.

At the far end of the room is the section where the payroll and costing work is done. The accounting machine is in one corner, partly screened by a low acoustic-tiled partition.

The large windows on the outside wall have off-white net curtains, which absorb sound and let in diffused daylight in harmony with the suspended fluorescent lighting. They also hide the old-fashioned and ugly window frames.

Continued on page 104



All because of a blasted boiler

If only the draught fan had been working! If only one small louvre in the furnace door had been open! If only the ventilation had been adequate! But they weren't. There was a flue gas explosion, and everything was up with the boiler house.



What Vulcan say about it

Disasters like this accent the vital need, not only for complete insurance cover, but also the inspection to hunt out the danger spot, prevent the disaster. And the people with the know-how are Vulcan.

Our Engineer-Surveyors are specialists, and nothing escapes their scrutiny. Every heating plant will be safe as boiler houses after they've seen and gone. In lifts, hoists and cranes, too: if there is trouble on the way, they'll put a stop to it. In other words, and it can't be said too often, safety first is Vulcan first.

FREE. For news of industrial accidents and ways to avoid them, ask us now for 'Vulcan', a quarterly journal for Power users. Please write to Dept. 4.



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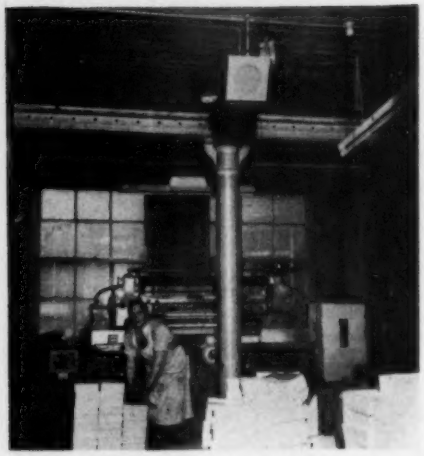
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HOLborn 7221



MUSIC WHILE YOU WORK programmes are relayed all over the factory via a control point above the switchboard. Internal telephones have provision for cutting-in direct to the loudspeakers

The decor of the office is colourful. The curtaining is bright red; ceiling, partitioning and paintwork dove grey. The wall at one end deep sea green, and the opposite wall apple green. The floor is made up of hardwood panels, and all desks are black with grey imitation leather tops.

The large outside windows have been sealed to cut out draughts, but there are two electric fans, high up in the opposite partition, which together can change the air in the room every eight minutes. So that heating units do not take up precious floor space, they too are mounted high up on the wall, with fans behind them, to blow the warmth down into the room.

From a control point above the switchboard, music-while-you-work programmes are relayed over the factory loudspeakers. Each executive has on his desk an internal telephone which provides for cutting in direct to these loudspeakers, so that when he wishes to locate somebody, he does not have to ask the telephonist to make a broadcast.

Old files of invoices, orders, etc., which are very rarely referred to, are kept on a shelf above the executives' desks and curtaining runs the whole length of this shelf to hide the files from sight.

Current records are kept in six-tier lateral files in a back-to-back half partition which helps to divide the office. To help reduce noise, this partition is clad with acoustic tiles, and is curtained off. Likewise, the company's two big safes, instead of being placed side by side on the floor, have been stacked one on top of the other in a partition-box which also is covered with acoustic tiles and curtains.

Many space-saving ideas are used. The telephonist's own telephone and message trays are on the wall beside

A WHOLE DAY'S COPYING

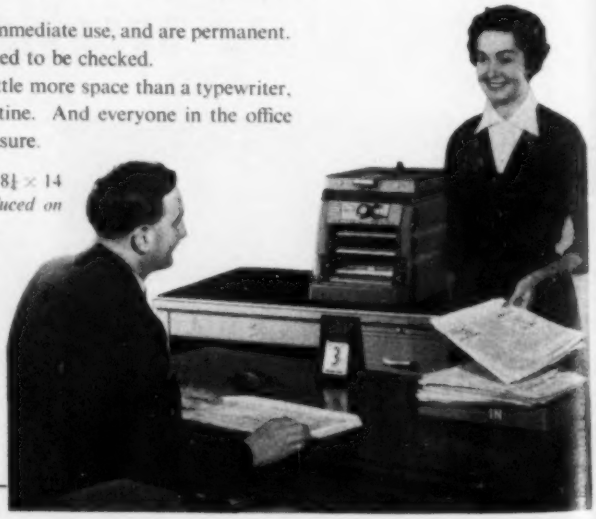
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The new 'Verifax' Copier will enable you to do the equivalent of a whole day's copy typing in less than an hour (for example, up to six copies each of 40 to 50 documents).

The copies are produced dry, ready for immediate use, and are permanent. Being photo-facsimile copies, they do not need to be checked.

The Copier is self-contained, requires little more space than a typewriter, and fits comfortably into existing office routine. And everyone in the office can use it. Full details will be sent with pleasure.

ANYTHING *written, typed, printed or drawn, up to* 8¼ × 14 *inches, single-sided or double-sided, can be reproduced on the 'Verifax' Copier* in less than one minute.



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MARK I

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Light in weight!

At 34 lbs. it's one of the lightest standard machines on the market. Yet this has been achieved without sacrifice of strength or durability!

Unique Locking device!

Both carriage and keyboard can be secured by means of a key-operated lock.

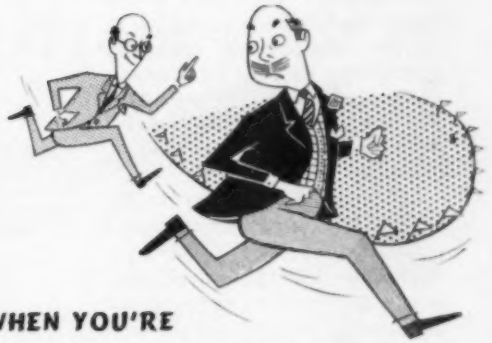
Plus –

Lightness of touch. Clarity of type. Extreme quietness in operation. Unique positioning, design and simplicity of controls—all these are features of the new Byron Mark I.

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WHEN YOU'RE

BEING DRIVEN ROUND THE BEND...

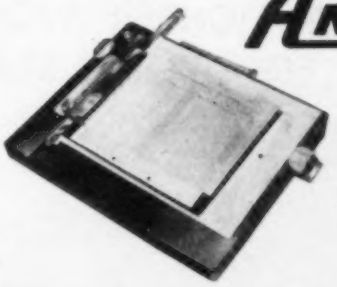
Are you missing prompt payments because your clerks send out statements so late? Do they insist it's the best they can do? That you need more staff? The answer to your problem is an ANSON Multipost Machine.

The Anson Multipost Machine enables one clerk to make **3 postings simultaneously.** For example, one writing automatically completes Customer's Statement, Sales Ledger and Journal. Statements are ready to be sent off on the first of each month (and money comes in more quickly). The risk of mistakes in transcribing thousands of entries from Ledger to Statement is eliminated and the special layout of the Anson Sales Day Book gives proof of the arithmetical accuracy of all figures.

The Anson Multipost Machine is equally time and labour saving for the Purchase Ledger, Cash Receipts, Stores Records, Payroll and P.A.Y.E. or any other accounting application involving two or more records using a common set of figures.

Full details will be sent on receipt of the completed coupon below.

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Please send full details of ANSON MULTIPOST MACHINE

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- ☐ Costing
- ☐ Other applications

B

her, instead of on her desk. Distribution trays for papers going out to the sales representatives have been built into the wall near the telephone exchange. As the windows are large and extend up to the ceiling, a wall-chart is hung in front of one of them, helping to cut down glare.

Beside each desk, there is either a little cabinet or a stack of trays, occupying the space by the chair which is normally unused. (Just enough space is left for the desk drawers to be pulled out). Many records are kept in mobile cardwheels, which can be taken to the desk of anyone who wishes to refer to them.

Because of the ten-year-lease, there has been no expensive decorating. Brick walls, for example, have been painted instead of plastered. When a building is re-modelled like this, almost the whole cost can be charged to 'repairs' and deducted immediately from taxable profits. But if a firm buy a new office building the capital cost must depreciate over a long period, during which time capital is tied up. Thus Dansford's venture is an excellent example of how to make the most of an old building at a low cost.



HELP-YOURSELF SERVICE for refreshments eliminates fixed breaks. The company believe this saves time and keeps staff contented

Mr. Rubin's ideas on organizing staff work are as unusual as his office layout. For example, there are no fixed tea-breaks in the morning or afternoon. Just outside the office stand two vending machines—one for coffee and the other for soft drinks—which members of the staff may use at any time they wish. The coffee machine has been converted to take three-penny pieces, and the company run it at a loss. Mr. Rubin feels this system wastes less time than conventional breaks and keeps the staff more contented.

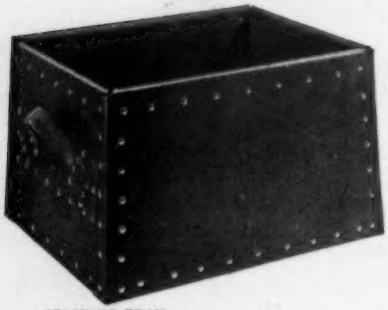
A practical result of the reorganization is that the office staff is no bigger than it was when turnover was one-third of the present figure. *END*

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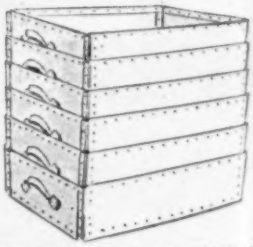
NESTING TRAY

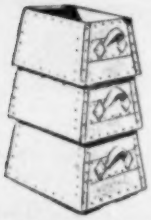


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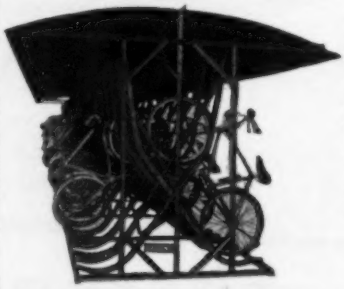
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The planning board is an important part of the control system at Bray's. Cards describing the work are filed in slots with their shaded portions arranged to form 'bars', representing machine loading. A cursor, moved daily, shows when production is behind schedule.

At-a-glance Machine Loading Cuts Production Delays

Since reorganizing their production control system, a firm manufacturing more than 5,000 catalogue items—plus many specials—know at any time the availability of machines and labour, as well as the progress of each job. As a result, stocks and work-in-progress have been reduced considerably.

By GEORGE T. RAE

THE manufacturing problems of Geo. Bray and Co. Ltd., of Leeds are complex. Their products range from small ceramic components, of which there are some 50,000 to a pound weight, to air duct heating units up to 10ft. square. In addition to the 5,000 catalogued standard items, the company manufacture to customers' specifications and often design special products for them as well.

Bray's production planning and control system, revised in January 1956, is designed to ensure that:

1—Capital is not tied up in unnecessarily large stocks of raw materials, work-in-progress or finished products.

2—The manufacturing cycles take full account of priorities.

3—Machines are loaded as evenly and efficiently as possible.

4—Work is moved quickly between the various operations and does not get 'lost' on the way.

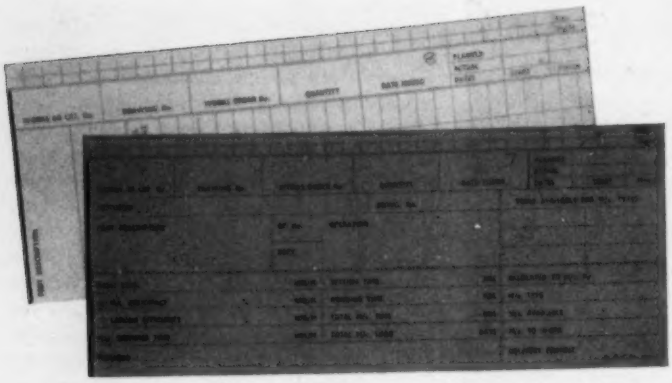
The factory is divided into three main production departments, producing gas burners, electro-ceramic insulators and electrical heating elements respectively. Each month a separate works management meeting is held for each department, presided over by the senior executive in charge of production and attended by the general works manager, the departmental works managers and other executives in charge of purchasing and services. At these meetings the departments' work load, manufacturing capacity and labour position are considered in detail and the necessary decisions are taken to keep these factors in balance. A comprehensive analysis of labour and output during the previous four weeks is used as a guide to draw up a basic manufacturing schedule for the ensuing period. This has to take into account fluctuations in demand for standard items due to seasonal or economic considerations.

If any department is threatened with a shortage of work the effect has to be cushioned by manufacturing for stock. For instance, orders for burners fall away during the spring and summer months, but if Brays did not stockpile during these seasons they would find difficulty in meeting the sharp demand during the autumn.

Normally the optimum stock level for all items is pre-arranged with the sales office. Departmental chiefs have no authority to exceed these levels. Should the works manager think it is advisable for any reason to do so, he must get the approval of the sales office concerned so that they can step up their efforts accordingly.

Orders for standard items are dealt with by the sales offices and are normally met direct from stock, but orders for special products require the preparation of an estimate of cost. Therefore, they are passed to the work study and estimating department who break them down into elements and prepare estimates covering the machining and processing times and the tooling costs. Each repeat order for special products passes through the estimating department for reference to the original estimates which are filed there.

Whether a job is a special or a standard item for stock, it has to be allotted materials, labour and machining time, in a way which causes the minimum interference with other work. Once on the factory floor, it has to move quickly from one process or operation to the next. The main factors in the revised procedure



These cards are used with the planning board shown on Page 109. One shows the amount to be made; the other the amount produced and the proportions 'good' and 'rectifiable'

for achieving this are planning boards which help each foreman to load his machines as efficiently as possible with due regard to the urgency of the different jobs which are given to him.

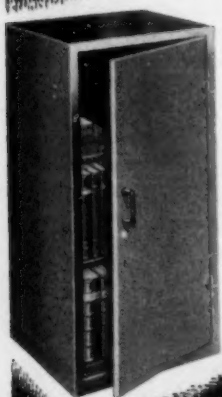
All customers' orders pass through the sales office. After the office has checked whether or not the goods can be supplied from stock, the orders are sent to the works order department endorsed either "ex-stock" or "to make". The works order department issues the appropriate order on the works, in triplicate, if the items have to be made. One copy is retained and filed, and the other two are given to the appropriate departmental progress office.

This office also receives from the order department a materials record card and two copies of a delivery record card. The progress office retains one copy of the works order and passes the other to the cost records office. One copy of the delivery record card is sent to the foreman of the section where manufacture is to begin. Meanwhile, the appropriate raw material store receives the material record card and supplies the material to the department concerned, entering the amount on the card.

So that the finished part store has advance notice of the manufactured goods which they will be receiving in due course, the progress office sends them the other copy of the delivery record card. The foreman sends his copy to his own stores, where records are kept of the size of each batch manufactured or processed. The delivery record card then accompanies the work as it progresses from department to department.

The progress office also issues the cards which are used in conjunction with the planning board—a pink

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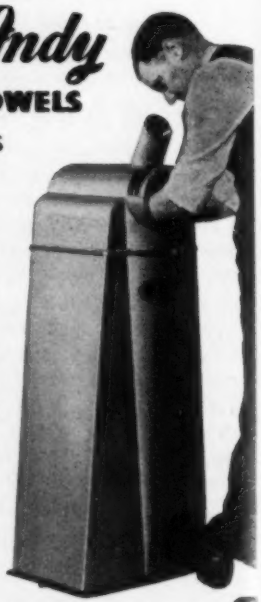
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planning card and a yellow progress card. The pink card gives such details as the works or drawing numbers, the quantities to be made or processed, and the operations required. The yellow card bears the same information, but in addition has spaces for the date of processing, the quantity 'good' and the quantity 'rectifiable'.

The pink card is sent to the foreman concerned, to inform him of the machines to be used, the anticipated duration of the operation, and whether night shift or overtime is necessary. Night shifts are worked only at the discretion of the departmental manager. The yellow card also goes to the foreman, but awaits details from the departmental works manager about the programming of operations.

A clerk from the progress office enters on the pink card the piece-rate for the operation. If, in the case of a new job, the rate is not known, this is not allowed to hold up the work. The card is sent to the estimating department for a rate to be entered from the estimates which they prepare for each operation before the order is placed on the works.

'Bar' Loading

From information supplied by the foreman, and the piece-rate, the clerk shades in appropriate blocks along the top edge of the pink card, which represents the estimated shifts to be worked. The same thing is done on the yellow card.

The foreman then places the cards in a slot board, the yellow one in front. Each slot represents a machine and the cards are arranged so that the shaded portions on all the cards in the slot—representing all orders allotted to that particular machine—form a continuous 'bar'. Thus the foreman can see at a glance the loading on the various machines.

A vertical date cursor is moved each day horizontally across the board by the progress clerk. When manufacture begins, the foreman ensures that the loading channel concerned is to the right-hand side of the date cursor, and removes the yellow cards from the board and lays them aside.

Each day a clerk copies on to the yellow card the number of items manufactured or processed, the numbers 'good' and 'rectifiable' being recorded. This information is taken from the operator's daily time and credit tickets. If the machine is still being set-up this is recorded on the yellow card.

Progress Check

According to the progress made with the job, as shown on this card, the slide containing all the cards is moved along the board. If progress is better than the estimate, it is moved to the left; if worse to the right. When the job is completed the yellow card is kept for a time and destroyed. The pink card is filed for future reference.

There is a rate card for each operation involved in the manufacture of each item. As well as supplying piece-work rates for wage calculations, these cards:

1—Standardize descriptions of operations.

2—Help to control the movement of work through the factory.

The existence of a rate card for each operation eliminates the danger of a process being called one thing by a foreman and another by the operator or machine-setter, with consequent confusion when wages and costs are assessed. The listing on the card of the next operation helps to avoid work going astray.

It is the responsibility of the work study department to issue a full set of rate cards for each order before the work begins, but the rates cannot be endorsed on the card until the time study section has assessed them. When rate cards are issued in advance of the operation being performed, the operational sequence is extracted from a sheet compiled at the design stage.

By these methods, production is controlled from receipt of the customers order through the design and manufacturing stages to final despatch. *END*

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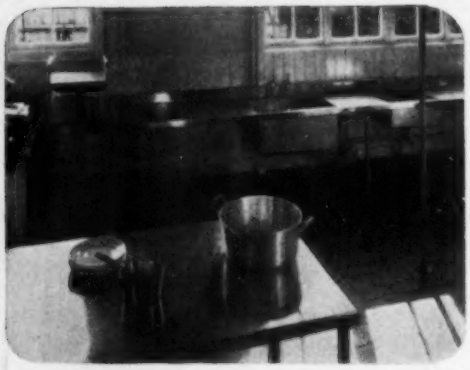
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Six Ideas from New Canteens

By GEORGE HAMILTON

Most new or re-built canteens embody an original or unusual idea. Here are some of the latest variations on the industrial catering theme.

Humanized ▸

WHEN C. and J. Clark Ltd., Somerset shoe firm, decided to re-design their works canteen recently, they called in a London firm of design consultants. Main problem was that the room available was about ten times as long as it was wide.

The solution was to use screens made of pitch pine boards, with creeper plants growing up them from flower boxes below. The screens are fitted with castors, and can be moved easily as required. They effectively break up the length of the hall without hampering the free movement.

Automation note: running the whole way along the right-hand wall, under the murals, is a moving conveyer belt. This takes dirty dishes to the kitchen at the far end of the room.





◂ Togetherness

STRANGE psychology lies behind the planning of this tasteful, restaurant-like executive dining room at the Atomic Weapons Research Establishment, Aldermaston, Berkshire. For only a waist-high partition and a decorative glass screen separate this room from the rather more austere canteen for non-executive employees.

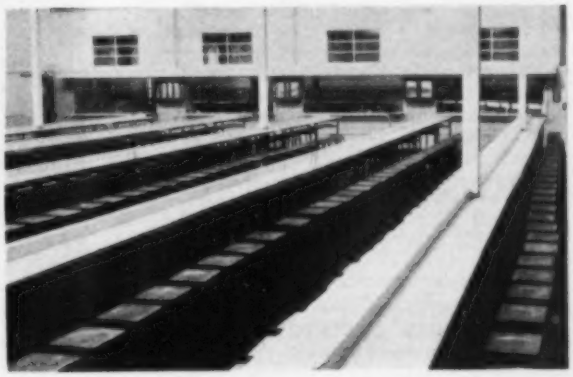
The two dining areas are served by a common kitchen which copes with over 2,500 meals a day. In both rooms colour has been used lavishly by the architect. Tables have tops surfaced with laminated plastics in blue, red and yellow. Similar material is also used for the working surfaces of the serving counters.

Quicker Turn-round ▸

TABLES and chairs were removed experimentally from this dining room at the Liverpool works of Automatic Telephone and Electric Co. Ltd., where 7,000 people are employed. Instead, high stools and snack bar counters were installed, increasing seating capacity from 500 to 700.

The servery that used to dispense main meals has

Continued on next page



been divided into four service points, dealing with soups, sweets, hot snacks and confectionery respectively. Kiosks dispense mineral waters, ice cream, biscuits, sweets, chocolate and cigarettes. Tea is sold from mobile urns.

The idea is that this dining room will cater mainly for workers who bring their own sandwiches, but wish to supplement them. In practice, this has worked out, and the experiment is considered to have been successful. Sales on an average day are estimated at 250 soups, 475 hot snacks, 300 sweets and 625 pastries and cakes.



Prefabricated ▸

MOST of a 10,000 sq. ft. extension to the headquarters of Berlei (U.K.) Ltd. at Slough consists of this canteen and social centre. At the near end is a stage, and to provide unobstructed vision along the whole length of the hall, prefabricated stressed concrete support sections were used for the building. These provide a very much cleaner roof than the usual steel girders associated with this type of structure. In addition, imaginative lighting has made the ceiling an interesting feature.



◂ Maintenance Reduced

WHERE a canteen is in use 24 hours a day, particular attention must be paid to maintenance arrangements. These are liable to be more frequent than in other canteens, because of the greater use that is made of the facilities, but must not interfere with the serving of meals to all shifts.

At Enfield Rolling Mills Ltd., Middlesex, this problem was tackled by panelling the walls throughout the company's new canteen, as well as in the kitchen and the food store, with sheets of laminated plastics.

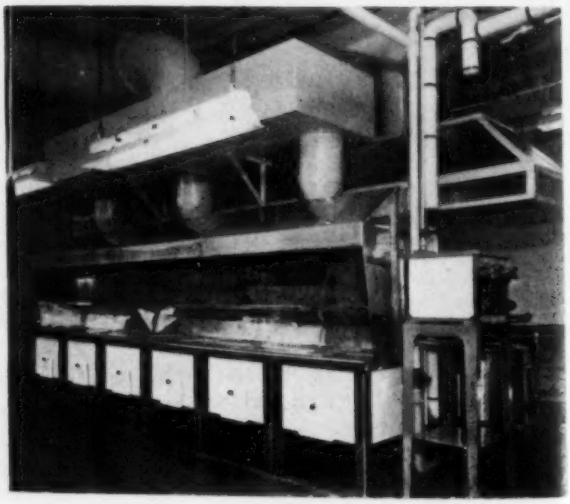
In all, some 2,200 sq. ft. were used, a buff-coloured stardust pattern contrasting with thin black strips.

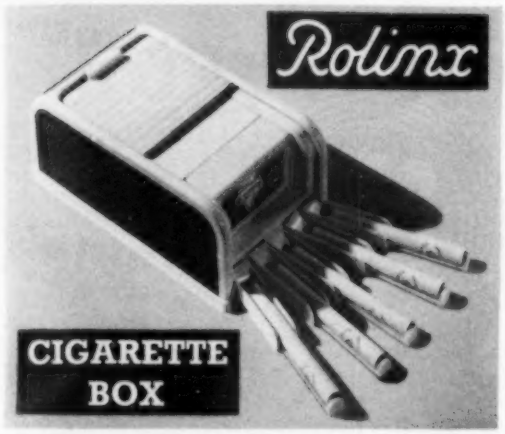
Enfield Rolling Mills feel that the heavy expense of this move will be more than compensated by the easy-to-clean qualities of the material, and by the fact that re-decoration and other maintenance will not be necessary for some considerable time to come.

Air Extracted ▸

FLOW-LINE catering is the idea behind E.M.I.'s new canteen at Hayes, Middlesex. The kitchen lies between two dining areas, and serving counters run the full width of the kitchen on both sides. The main crockery washing-up point is at the far end of the kitchen, with separate entrances from each dining room, thus avoiding traffic through the cooking area.

Normal difficulty with this type of lay-out is that kitchen smells blow through into one or other of the dining rooms. E.M.I. have overcome this by a combination of forced-draught heaters and air extraction plant (seen here). These maintain air-flow *into* the kitchen and prevent any smells from seeping out.





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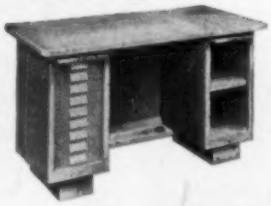
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- **Speeds service**

No capital outlay. Free service.

★ **"Canteen meals service speeded up 25% since installing these machines,"**

says the Personnel Manager of BOWATERS FIBRE CONTAINERS LTD., Croydon, Surrey.

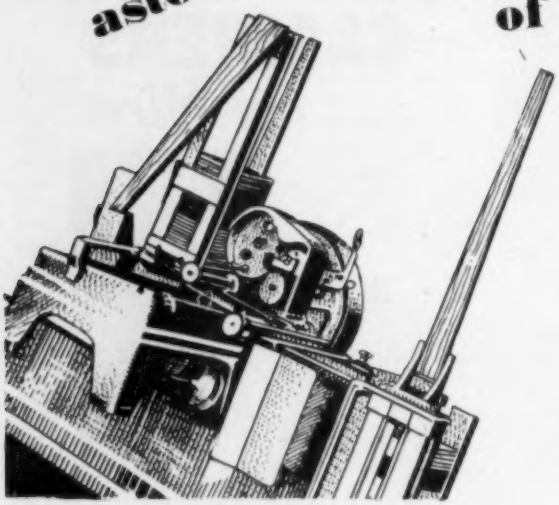
Write to :-

NATIONAL AUTOMATIC MACHINES
LIMITED

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RENTAL DIVISION, Dept. B(7)
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MODEL 350
More than **TWICE AS FAST** as any Addressing machine of **EQUAL SIZE**

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BUSINESS *Equipment Survey*

NEW AIDS TO GREATER OUTPUT AND LOWER COSTS

FOR YOUR OFFICE

High-Speed Tabulator

HIGH speed and versatility are the outstanding characteristics of the *Samastronic* punched card accounting tabulator. Cards are automatically fed through the machine at a speed of



Movable printing head

300 per minute, and printing, at 140 characters per line, is at the rate of 300 lines per minute.

This very fast printing is achieved by an entirely new mechanism which, instead of the conventional type dies, uses a fine wire stylus for each character in a line of print. Characters are actually written as the paper moves beneath the styluses instead of being printed from pre-cast type. This set-up enables the machine to produce text in any European language, in addition to figures.

The machine uses double-80 cards which, by punching between lines can carry up to 200 columns of information. The standard model has capacity for seven additive sections, each of which has a ten-digit independent unit usable for decimal or sterling addition or subtraction. An automatic device prevents the machine from working if arithmetic is incorrect. If this should happen, the operator herself can remove the faulty unit and plug in another from the spares supplied.

Data from the cards can be fed to any unit to appear under the appropriate heading on the final sheet. Cross-transfer facilities permit cross-addition, and sub, grand and accumulative totals can be made.

A complete phrase can be printed from one perforation in a card. Similarly, duplicate or triplicate printing in parallel can be done from a one-hole 'instruction', thus eliminating the need for carbons.

Two versions of the machine are made. One is a comprehensive accounting machine, as described above, which can function with only punching and sorting equipment. The other, with the same printing capacity and speed but with limited adding capacity, can be used in conjunction with an electronic computer. A smaller model, to be used with 65-column cards, is also to be manufactured.

Powers-Samas Accounting Machines Ltd., 88 High Holborn, London W.C.1

Executive Desk

DESIGNED to harmonize with the contemporary office, the *Knightsbridge* executive desk has a large working surface—5ft. 6in. by 2ft. 9in. The left-hand pedestal incorporates one shallow and one deep drawer; the right-hand pedestal has two shallow drawers and one slightly deeper. Both sets of drawers can be locked.



Ample elbow-room

Top and pedestals are teak, the latter suspended within an ebonised frame.

Trollope & Sons (London) Ltd., West Halkin Street, London S.W.1.

Portable Index

BOUND in black morocco-grained plastic, and closed with a slide fastener, the *Roneodex Porta-record Book* makes an attractive and convenient visible index for the traveller.



For records and papers

It has a capacity of 50 record cards in standard 8in. by 5in. or 6in. by 4in. sizes. In another form, it holds 25 of the larger cards on one face, with a wallet for loose papers on the reverse side.

Cards are held in pockets so as to be easily removable if necessary, the visible lower edge of each forming the index.

Roneo Ltd., Southampton Row, London W.C.1.

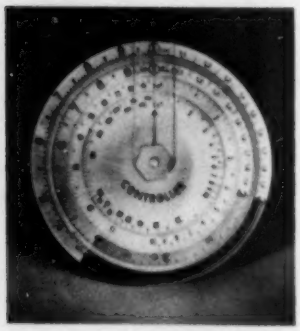
Pocket Calculator

MANY of the functions of a slide rule can be performed on the *Controller* pocket calculator. These

★ Equipment included in this survey is selected for its news value alone. Manufacturers are invited to submit details of *new* and interesting products for consideration. An original photograph should accompany each item submitted.

include multiplication, division, percentages, interest computations, currency conversion, and more technical operations such as square and cube roots.

Circular in shape, the calculator consists of two dials, the larger just



Easy to use

under 3in. in diameter, and a transparent cursor. Calculations are done by rotating the dials and reading off the result. No special skill is required to operate it, the manufacturers say.

K. Bisset and Co. Ltd., 145 *Grand Buildings, Trafalgar Square, London W.C.2.*

Desk-side Filing

A SMALL-SIZE lateral filing cabinet known as *Reach-In* aims to place files within arm's length of desk



Holds 150 files

workers, thereby saving innumerable journeys between desk and files.

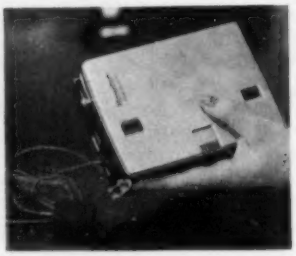
Only 39in. wide and 42in. high, the cabinet is small enough to be placed at the side of a desk, but will hold 150 files suspended from metal rails.

Available in oak, mahogany or walnut, it has rounded edges and an inlaid Formica top. It can be supplied empty or fitted with files.

Panda Office Equipment Co., 18 Buckingham Palace Road, London S.W.1

Miniature Recorder

THE *Dictet* pocket recording machine is battery-operated, weighs only 3lb. and looks like a camera. Recordings are made on quarter-inch magnetic tape, 60 minutes to a



Battery-operated

reel. Playback facilities are included, but for transcription purposes a foot-pedal and earpiece may be purchased as extras.

An alternative means of transcription is re-recording on a *Time-Master* office dictation machine by means of a special attachment. Use of this means that a traveller can mail tapes back to head office for transcription without delay.

Dictaphone Co. Ltd., 17-19 Stratford Place, London W.1

Rapid Accounting

NEWEST addition to the *Sensimatic* family of accounting machines is the *Typing Sensimatic* with an



Types words and figures

84-character typewriter keyboard. The keyboard, designed for rapid operation, is connected to a box printer which, in a space 2in. wide by 1in. high, contains all the type dies, including fractions, symbols and alphabet. Elimination of the conventional arm-and-lever mechanism makes possible a typing speed of up to 100 words per minute, it is claimed.

The carriage on this model has been completely redesigned. Smooth-moving, it operates automatically or by means of manually-operated column selection keys.

All the previous *Sensimatic* features are retained in the new model. Among these are fully automatic repeat printing, which produces statement and ledger both as top copies; full posting visibility; one-hand form insertion; transparent adjustable form guides; and a control key which converts the machine to do duplex adding-figuring.

Burroughs Adding Machine Ltd., 365 Oxford Street, London W.1

For Office Copying

A SMALL office photocopying machine, the *Bandavelop Junior Twin*, is designed for all routine work. Housed in a single compact unit, it produces copies in a matter of seconds of letters, documents etc., up to 8½in. wide. Originals of almost any colour can be reproduced, including material written in pencil. An alternative model is for use under bright light conditions.

Companion to the *Junior Twin* is the *Book Twin*, which includes in its scope pages from bound books, ledgers, and so forth. It is automatically

What form of management training do you think the executive over 30 needs?

See Card facing Page 80.

BLICK

WATCHMAN'S CLOCK

Your Watchman is your security



The BLICK System provides a simple, effective and inexpensive method of ensuring that your Watchman not only carries out his duties conscientiously, but carries them out in the special way advocated by the police—the way that virtually removes all risk of your premises being broken into. Write now for 12-page booklet describing this unique system.

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MONarch 6256

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means more sales at less cost . . .

Sales managers of Britain's biggest companies—marketing every kind of product and service—have found that TACK Sales Training contributes positively to solving their major sales problem: *How to increase turnover without raising costs.*



BEA

Mr. HENRY HILL, Sales Manager of British European Airways, the renowned international Airline Company, says:

"We sell intangible products—passenger and cargo space . . . could a professional training organisation help B.E.A.'s selling needs? The answer has been 'Yes', our men all benefit from a TACK Course."

B&P

From Brown and Polson Ltd., leading manufacturers of cornflour and other food products, comes this statement by Sales Manager BERNARD McCARTHY:



"We use the TACK Organisation regularly to supplement our training plan. We find it helpful for all salesmen, no matter how much previous experience they may have had."

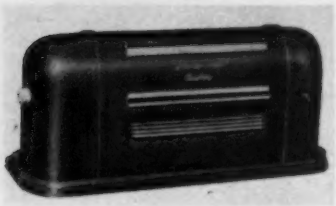
These firms, and hundreds more, have proved for themselves the value of TACK-trained men. Each year 2,500 salesmen and sales executives attend TACK Courses. May we send you details of how we can help *your* company?

Tack Course in Salesmanship and Human Relations — 3 days

Tack Course in Sales Management 2 days

THE TACK ORGANISATION
1-5 LONGMOORE ST., LONDON, S.W.1
VIC: 5001-4

BUSINESS *Equipment Survey*



One-unit photocopier

adjustable to any page thickness and reproduces the entire page, including margins. The machine has a built-in dispenser for storage of negative and positive papers.

Block and Anderson Ltd.,
58-60 Kensington Church Street,
London W.8

Colour Spot Carbon

SPOT carbonizing — i.e. placing patches of carbon on backs of forms—can now be done in a range of colours. Object of this development is to help analysis work on carbon copies by picking out selected items in colour. Accounting analysis, for instance, could be considerably speeded by visual identification of coloured figures at any required spot on the copies.

Continuous stationery or separate forms can be treated in this way. Preprinted forms can be carbonized, or forms printed and carbonized to customers' own specifications.

The Victoria Printing Co.,
2-3 Victoria Chambers,
Luke Street, London E.C.2.

Cabinet-Desk

A NEW desk with special storage space for stationery is designed for the clerk or typist who handles a variety of forms or letterheads. In the left-hand pedestal is a pull-out cabinet which contains 17 different compartments. The slope at which the cabinet comes to rest after opening makes every section visible and within easy reach. Its close fit protects the stationery against dust.

Two small cupboards, one of which locks, are contained in the right-hand pedestal. Top size of the desk is 4ft. by 2ft. 3in. and the height is 2ft. 6in. Three finishes are available —light, medium or dark wood.



Storage for stationery

Office Equipment Distributors (B.T.L.) Ltd., Birmingham Road, West Bromwich, Staffs.

Interceptor Phone

HOUSED in a neat box which fits on to the base of a telephone, the five-way *Interceptor Unit* enables one

have

your filing . .

put into

50% Less Space

with



RAILEX

LATERAL FILING

The FIRST and BEST

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- Greatest Range to suit all filing requirements

. . . *and all at* **Less Cost**

FULL INFORMATION FROM :

FRANK WILSON & CO.

WORKS : Cross Street, SOUTHPORT, Lancs. 'Phone 2133
LONDON : 11 Lackington Street, Moorgate, E.C.2. 'Phone MONarch 8907

secretary to answer four phones in addition to her own. Each extension connected to the interceptor has a lamp and push-button. When a call is made on any of the phones, the corresponding lamp flashes, and pressure of the button connects the incoming caller.

No switch-through is necessary on the extensions which are intercepted. When the user answers the calls himself, the flashing light goes off at the



Five-in-one 'phone

secretary's end, showing her that she need not intervene; continued flashing shows that she should take the call.

This device should prove useful for salesmen and others who are frequently absent from their offices for long periods.

Communications Systems Ltd., Strowger House, Arundel Street, London W.C.2

Lock-up Binder

THE *Micropost* is a permanent binder for sprocket-punched stationery. It incorporates a lock which, once closed, cannot be reopened. This effectively prevents removal of sheets unless they are torn bodily from the binder or the lock is destroyed.

The binder consists of a pair of hinged boards and two-piece binding mechanism. The latter comprises a base-plate with posts and a locking-plate which slides easily over the posts and closes automatically—for keeps. Bindings are of black rexine or millboard, and come in three sizes to accommodate sheet dimensions from 7in. by 7in. to 13in. by 18in. Special sizes can be made to order.

Cakebread Ltd., Baches Street, London N.1

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BENJAMIN FRANKLIN (A Rosicrucian)

WHY was this man great? How does anyone—man or woman—achieve greatness? Is it not by mastery of the powers within ourselves?

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Time - the measure of Efficiency!

Maximum efficiency demands the right time **ALL** the time throughout your organization. Our Controlled Electric Clock System is capable of an accuracy of plus or minus half-a-second per day and can control any number of Clocks, Time Recorders, Programme Instruments (for sounding "start" and "cease work" signals) etc.—all to a standard correct time. Many attractive models to suit all conditions are available for operation by our Controlled Electric Clock System or can be supplied for operation from the Mains.



Time Recorders are essential for efficiency when every minute costs money.
Connected to our Controlled Electric Clock System, the model illustrated prints the correct time simply by inserting the time card. The positioning of the time stamped on the card is automatically selected for the correct day and any "late" recordings are printed in red.



Waste of time searching for elusive executive staff can be eliminated by the use of our silent Staff Locator System. By a combination of coloured lights (either 3 or 4) set in attractive fittings, up to a maximum of 255 people can be signalled—silently —over any area regardless of the size of your organization. Details of our equipment for increasing efficiency and saving time will gladly be forwarded on request.

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BUSINESS *Equipment Survey*

INDUSTRIAL EQUIPMENT

New or improved products exhibited at this year's British Industries Fair

Automatic Hoist

THE *Lodematic* is a weight-sensitive semi-automatic hoist: a load placed on the platform is immediately raised to a pre-determined level without the need to touch any control, and as soon as the load is removed the platform descends quickly but smoothly. Some models have built-in counters to record the amount of work done. These can be set to lift only a given number of loads—sacks, bins, cases.

All models are only 24in. wide and can be pushed like barrows. They also 'telescope' to operate under low ceilings. The lifting mechanism is hydraulic and is powered by a small electric motor or petrol engine. One of the latest versions is a fork truck whose prongs slide into crates of milk or beer, enabling lorries to be loaded quickly and effortlessly without pallets.

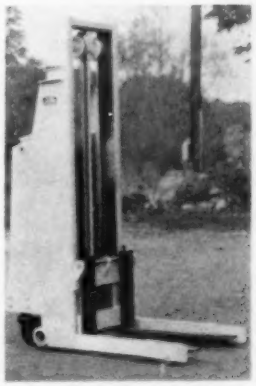


No need to touch controls

Lodematic, Clitheroe, Lancs.

Economical Lifting

FOR lifting jobs that are too heavy to do by hand and too small to justify the use of expensive equipment, the *Hycaddy* is economical and convenient. Several models are available, with capacities from 500 to 1,500lb. All are foot- or battery-operated. Battery operation (a built-in charger is an optional extra) is recommended for heavy duty.



Compact and economical

The lift of the smallest model is enough to load and unload lorries, yet overall height and width are such that it can be manoeuvred in narrow aisles and takes up little space when not in use. The largest model has a 12ft. lift.

Lifting is hydraulic and positive. With foot-operation, the load is raised to full height by a few easy strokes.

Long life is assured by two features: all moving parts have ball bearings; and construction is of folded and welded steel section, giving maximum strength with minimum weight.

R. H. Corbett and Co. Ltd., Hydrum Works, Burgess Hill, Sussex.

Reduces Fatigue

TWO-PEDAL control, reducing driver fatigue, is one of the attractions of the *Model 624D* forklift truck. Maximum capacity is 7,000lb.



Two-pedal control

The two-pedal control is made possible by a constant mesh gearbox, which improves performance and reduces the number of wearing parts. There are two forward speeds and one reverse, controlled by a lever on the steering column.

The transmission system is foolproof. Even if the gear lever is moved from top speed to reverse with the throttle wide, there is no jolt or judder—the truck comes quickly but smoothly to rest, then reverses equally smoothly.

The suspension system consists of large rubber bushes instead of conventional leaf springs. There are, therefore, no metal-to-metal bearings to lubricate or leaves to replace.

Power is provided by a 3.4 litre B.M.C. diesel engine, for which spares are available everywhere. Power-steering is available but normally the steering is very light.

I.T.D. Ltd., 95-99 Ladbroke Grove, London W.11

Pallet-less Handling

MOVEMENT of crates and cartons without the need for pallets is made possible by the *Load-Clamp*. Fitted to a 4,000lb. capacity electric truck, it safely transports loads simply by clamping them between movable jaws.

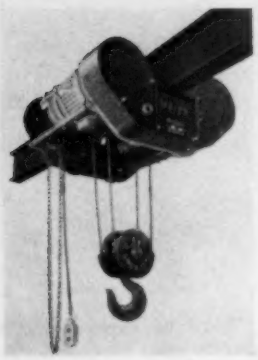
Conveyancer Fork Trucks Ltd., Liverpool Road, Warrington, Lancs.

Pulley Block

LOW headroom—only 17in.—is the outstanding feature of the *Felco* electric wire rope pulley block.

The travelling carriage can be operated manually or electrically, and the

BUSINESS *Equipment Survey*



Low headroom, high lift

maximum lift is 30ft. The 5h.p. hoisting motor, which is of the totally enclosed squirrel cage type, raises 5 tons at a rate of 11ft. per minute. Weight of the pulley block itself is about 10cwt.

Minimum maintenance is required. The main reduction gears run in a completely sealed oil bath. Contactor switch gear is totally enclosed, giving protection from dirt and moisture. Control is by pendant push button switch, and contacts are silver to silver.

Adjustable over-travel switches prevent hoisting and lowering beyond any desired limit, and in addition there is an ultimate limit switch.

Felco Hoists Ltd.,
29 Cromwell Road, South Kensington, London S.W.7

Revolving Store

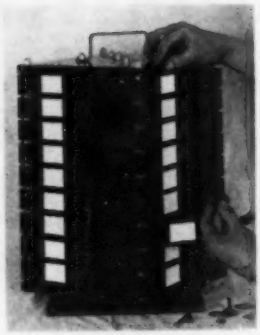
STURDY yet elegant in appearance, the *Fourway* storage unit combines maximum capacity with maximum accessibility. It saves time and space because it revolves, bringing each side into view.

There are 36 strong steel drawers, each 6in. by 3in. by 1⅛in. These are spring-tensioned and easily indexed. At the touch of a finger any drawer swings open, giving unrestricted access.

The *Fourway* is 17 ⅛in. high by 10in. square. It is made of heavy gauge steel and weighs 26lb. Finish is olive green and all fittings are cadmium-plated.

Smaller, portable versions with approximately one quarter the capacity are available.

Smallbone, 116 Raddlebarn Road, Selly Oak, Birmingham 29



Maximum accessibility

Rust Treatment

MOST anti-rust treatments use phosphoric acid or some other corrosive which has to be removed or neutralized before painting. A new tannating process, *Formula E*, not only eliminates the need for



HOW ARE YOUR BUSINESS NERVES TO-DAY?



You want important papers . . . vital information . . . a sample from laboratory or stores. How long does it take the nerve system of your business to react? How quickly do your requirements reach your desk and how much does it cost to get them there? Remember, your business organisation is just as strong as the link between its various sections. On the smooth flow of paperwork and materials its prosperity and progress depend. Lamson Carrier Tubes and Conveying systems provide the vital line of communications which enable your whole organisation to function at peak efficiency *all* the time. Why not consult Lamson (Dept. D.7) now?

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A NEW SPACE/TIME/LABOUR-SAVING CARD CONTROL SYSTEM

Rotadex is a revolutionary card recording and reference system with the outstanding advantages of simplicity, efficiency and extremely low price. With a simple swivel movement any card can be found quickly for reference, or entry — without removal, although cards can be easily removed when required. Rotadex is available in fourteen sizes accommodating from 500 to 3,000 cards of various size and description. Write to Evertaut for descriptive leaflets on Rotadex now.



ROTADESK

Literally card index control at your finger tips. Cards are contained INSIDE the desk and are selected from a rotating wheel through an opening on the desk top. Up to 12,750 cards can be accommodated and referred to quickly. Customers' own cards may be used.



ROTADEX ROTARY RECORDING

REVOLUTIONISES CARD REFERENCE

Write for leaflet No. S 12

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Sole Distributors:

EVERTAUT LTD. Proprietors: J. B. Brooks and Co. Limited.
WALSALL ROAD, PERRY BARR, BIRMINGHAM 22B.
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PAYING FOR TIME

Time, directly or indirectly, is cost. If records of occupied time are not accurately kept the Firm concerned may well be paying for time it does not get. The systematic analysis of working time is a first step to increased production and lower costs.

The GLEDHILL-BROOK Time Recorder controls the use of time; it provides an indisputable record of attendance, time on a job, overtime and other figures essential to accurate costing and the economic employment of labour.

Write for full details and illustrated leaflet to:

GLEDHILL-BROOK

GLEDHILL-BROOK TIME RECORDERS LTD.
38 EMPIRE WORKS - HUDDERSFIELD

neutralizing after the de-rusting stage; but itself provides a surface which, unpainted, resists rust for many days in damp and exposed conditions, and provides a keying surface for paint.

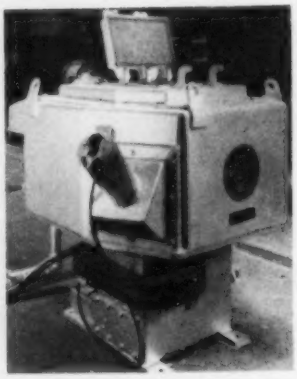
The tannin film cannot flake or chip because it is part of the metal itself.

Plus-Gas Co. Ltd., 1-11 Hay Hill, London W.1

Faster Casting

PRODUCTION in aluminium and alloy die-casting foundries can be speeded up by the use of an *Ajaxomatic* unit. This receives molten metal from a furnace, stores it at molten temperature, and pours it quickly and in exact amounts, as required.

It has a capacity of 300lb. and a maximum pouring rate of about 2lb. per second. The use of compressed air to eject the metal means that the amount delivered per shot is adjustable very accurately between ½lb. and 10lb. Once the timing dials are set a button is pressed and the right amount of metal flows from the spout in a gentle, controlled stream which can be directed into the chamber of the die-casting machine.



Controlled pouring

The unit can raise the speed of aluminium die-casting to that commonly achieved with zinc. When casting magnesium, a blanket of inert gas can be provided.

Castings are better because of freedom from oxides and scum. There is no temperature drop as between furnace, ladle, and die-casting machine.

Birlec Ltd., Tyburn Road, Erdington, Birmingham 14

Explosive Tools

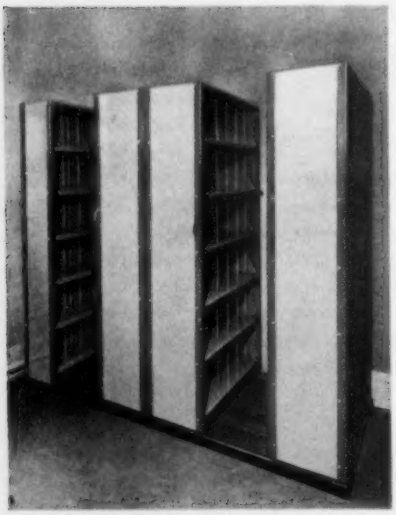
CARTRIDGE-operated fixing devices are reducing costs on many building contracts because of the ease with which fixtures for drawers, windows etc. can be made.

A bolt is shot by a cartridge from the *Rapid Hammer*. If the hardness of the material is known, the required degree of penetration can easily be achieved. The system is not suitable for all applications, but the following examples show its possibilities:

Bolts of $\frac{3}{16}$in. shaft were fired into concretes of different strengths and brickwork. Penetration varied from 1½in. to 2½in. and the force required for extraction varied from 2,700lb. to 4,000lb.

Explosive Power Tools Ltd., Hope Street, Dukinfield, Ches.

Glover's present their new



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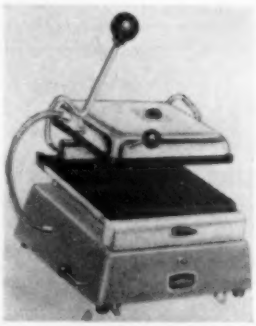
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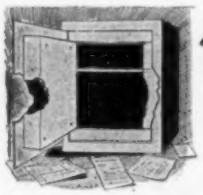
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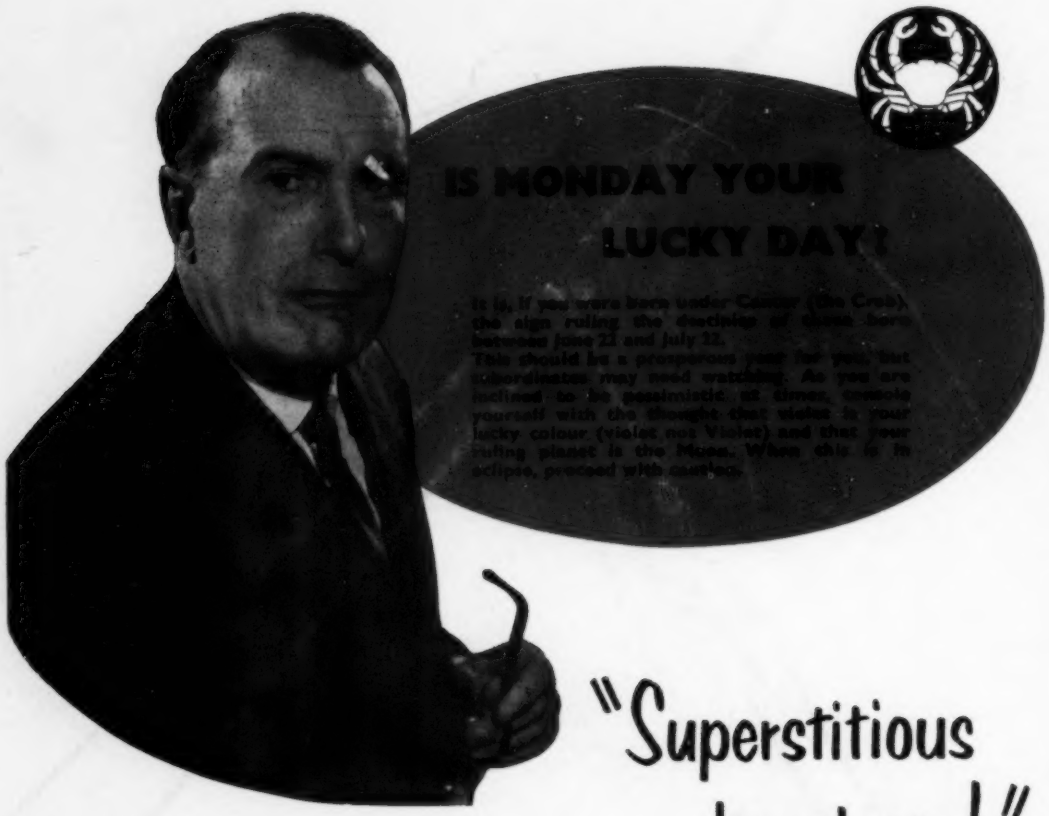
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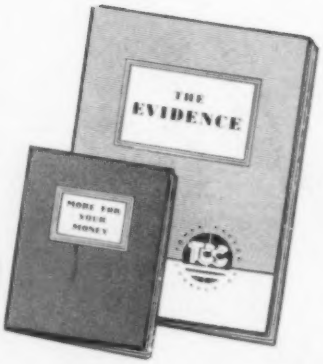
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